STEEL HAND BOOK

POTTS

HORACE T. POTTS CO

E. ERIE AVE. & D.S.R.

PHILADELPHIA

INTERNATIONAL

Digitized by

The Association for Preservation Technology International

For the

Building Technology Heritage Library

http://archive.org/details/buildingtechnologyheritagelibrary

TELEPHONES

PHILADELPHIA:

Bell ▲ REGENT 7450

Keystone ▲ PARK 5351

EMERGENCY SERVICE

at all hours after warehouse closes.

NIGHTS, SUNDAYS and HOLIDAYS

CALL

REGENT 7457

BALTIMORE:

Vernon 8260

EMERGENCY:

J. MELVIN LANE ▲ Liberty 1703

J. T. FRITZ ▲ Tuxedo 2353

DIRECTORY OF PERSONNEL

SEE PAGE 1

Copyright, 1938, Horace T. Potts Co.

POTTS
WAREHOUSE SERVICE

Potts Warehouse Service is now in its 123rd year. It has endured because its patrons, some through two, three, and even four generations, have found it dependable—dependable because an unselfish devotion to the best interests of the customer has ever been held as the main objective. Our service today is but little changed from our beginnings, *i.e.*, a PERSONAL CARE for every order or inquiry, no matter how large or how small. Our men are trained to high standards, both personal and technical.

Because our business is necessarily divided into departments, we can best serve you over the telephone if you will ask for one of our men who specialize in the particular steel or commodity you desire. We can also serve you best, if, when our outside men call upon you, you will give them the opportunity to discuss your problems. They are trained to an accurate determination of your needs and they will keep your interest first.

SALESMEN

Wm. B. Jackson
Horace T. Potts, II
J. Henry Kern
L. D. Willis
J. Melvin Lane
H. O. Whitaker
Wm. Hughes Dunlap
Donald C. Taylor

Arthur Wells, *Sales Engineer*

Charles M. Rusk, *Welding Engineer*

F. A. Guba, *Sales Engineer, Stainless Steel*

DIRECTORY OF PERSONNEL

GUY P. BIBLE
Sales Manager

ARTHUR L. COLLINS
Asst. Sales Manager

STANLEY L. BATEMAN, Mgr.
General Steels Division

ALLAN W. AINSWORTH, Mgr.
Tool and Alloy Steel Division

ROY K. CLEMENT, Mgr.
Fence Division

Baltimore Office
J. T. FRITZ, Mgr.

CLAUDE MENGEL
Office Manager

TELEPHONES:

Philadelphia { **Bell—REGent 7450**
Keystone—PARK 5351

Emergency Calls After Business Hours
Bell—REGent 7457

FOR INFORMATION BY TELEPHONE

on Commodities or Divisions NOTED BELOW	*Ask to Speak to Anyone* LISTED BELOW
Soft Steel Bars Structurals Plates and Sheets Reinforcing Bars Cold Finished Steels Machinery Steels	Gustav H. Mayer Nields B. Haas Thomas I. Potts Robert A. Neeley Curtis R. Spencer Stanley L. Bateman
Tool Steels Alloy Steels Stainless and Heat Resisting Steels	Wm. C. Spencer C. Lincoln Rutter Charles F. Coleman, Jr. Miss E. Florence Kean Allan W. Ainsworth
Metallurgical Service	Wm. C. Spencer Allan W. Ainsworth
Welding Rods Brass and Copper	Thomas I. Potts Curtis R. Spencer Stanley L. Bateman
Boiler Tubes Expanded Metal	Curtis R. Spencer Stanley L. Bateman
Fence, Grating Wire Rope, Slings, Chains Guards and Panel Partitions	Eric E. deVries Maxwell Weischadle
Service Department { Flame Cutting Welding and Assembling	Curtis R. Spencer Gustav H. Mayer Maxwell Weischadle
Deliveries—Expediting	Robert A. Neeley Miss E. Florence Kean
Pricing and Adjustments	Edward R. Potts Claude Mengel

ACCOUNTING DEPT.
Frank A. Ross
Cashier

CREDIT DEPT.
M. P. Truxton
Manager

INDEX

Page

A Abrasion Resisting Steel Plates 65
Accessories for Expanded Metal 52
ACCO Chain and Slings 112, 113
Acetylene Cutting 59, 60
Air Hardening Tool Steel No. 610 197
Alloy Machinery Steels 130–142
Aluminum Welding Wire 102
ANACONDA "Brass and Copper" 108, 109
Angles 10–13
ARMCO Ingot Iron Sheets 74–79
—Hot Rolled 75
—Plates 75
—Hot Rolled Annealed 75
—Galvanized 76, 77
—Corrugated Galvanized 78, 79
Atlas Slings 116, 117
Auto Body Sheets 69
"AW" SUPERIOR—Diamond Floor Plates 56–58

B Babcock & Wilcox Boiler Tubing 110
—Stainless Tubing 247
Band Steel 36, 37
Bar Size Shapes 10, 12, 17, 18, 46, 47
Beams 14–16
Bearing Metals 121
—"Perfection" Anti-Friction 121
—Frictionless 121
BETH-CU-LOY Copper Bearing Sheets 72, 73, 79
Bits (High Speed) 203
Black Steel Sheets 66, 67
BLAW-KNOX Grating, Stair Treads 54, 55
Blue Annealed Sheets (Steel) 66, 67
Boiler Tubes 110
Box Channels 18
Brass Rods—Rounds 108
—Hexagon 108
—Square 108
—Rectangular 108
Brass Sheets 109
Bronze Welding Rods 102
Brushes, Welders 107

C Cable, Welding 105
Cable, Wire 114–120
Carbon Machinery Steels 123–129
Carbon Rods, Welding 105
Car Building Channels 20
Carpenter High Speed Steels 198–209
Carpenter Stainless Steel Tubing 248, 249
Carpenter Tool Steels 148–210
Castings, Stainless 234
Chain Link Fences 260
Chains and Slings 112, 113
Channels 18–20
Charcoal Iron Tubes 110
Chrome Nickel Alloy Steel 132–135
CHRO-MOLY Alloy Machinery Steel 136, 137
Clips—Pfeifer 80
Cold Finished PENN 34, 35
Cold Finished Steel 21–35
Cold Rolled Sheets and Plates 69
Colmonoy 98
Comparative Hardness (Table) 265
Concrete Bars 20
Concrete Reinforcing Mesh 49, 52
Connectors, Welding 107
Copper Bearing Steel Sheets 72, 73
Copper Ferrules 111
Copper Sheets 109
Corrosion and Heat Resisting Alloy Castings 234
Corrugated Galvanized Steel 78, 79
—BETH-CU-LOY 78, 79
—ARMCO Ingot Iron 78, 79
—Roofing 78, 79
—Siding 78, 79
COR-TEN 65A
Cover Glasses 104

D Deformed Bars 20
Diamond Pattern Plates 56–58
Directory 1
Drag Line Chains 112, 113
Drew Slings 116, 117
Drill Rods 211–213

INDEX

Page

D Drill Steels—Potts Hollow 145
—Potts Solid 145
Dutch Boy—Perfection Bearing Metal 121
D. Y. O. Tool Steel 204–206

E ELASTUF CHRO-MOLY 136, 137
ELASTUF Forgings 132
ELASTUF MEDIA Machinery Steel 32, 123, 124
ELASTUF PENN Machinery Steel 34, 35, 125–129
ELASTUF S.A.E. 2335 ..... 130, 131
ELASTUF S.A.E. 3140 132–135
ELASTUF Steels 123
ELASTUF Type A Alloy Machinery Steel 138–142
Electrical Sheets (Armco Ingot Iron) 77
Electrodes, etc. 81–107
Electroforged Stair Treads 55
EMERGENCY SERVICE ..... A
Expanded Metal Mesh 50–52
Expanded Metal Reinforcing Meshes 50–55
EXTRA No. 11 Tool Steel (Carpenter) 150–152
Extras—Cold Finished Quantity 293
—Hot Rolled 295
—Tool Steel 292
—High Speed 293
EXCELO Tool Steel 207–209

F Farm Fences 260, 261
Fences—Chain Link 260, 261
—Wrought Iron 260, 261
—Farm and Lawn 260, 261
—HABITANT (Wooden) 260, 261
Ferrules 111
Flame Cutting 59, 60
Floor Plates 56–58
Flux, Welding 105
Forgings 122, 132
Frictionless Bearing Metal 121

G Galvanized Sheets—Steel 70, 71
—BETH-CU-LOY Copper Bearing 72, 73
—ARMCO Ingot Iron 74, 76, 77
Gas Cutting 59, 60
Gauges—Standard 272
—Weights 273
Gloves, Welders' 107
Goggles, Welding, etc. 106
GOLD STAR Tool Bits 203
Grating—BLAW-KNOX 54

H HABITANT Wooden Fences 260, 261
Half Ovals 46
Half Rounds 47
HAMPDEN Tool Steel (Carpenter) 192–196
H Beams 16
Heat Resisting Steels 214, 234
Helmets, Welders 106
High Carbon Plates 64
High Speed Bits 203
High Speed Steels 198–209
Hoop Steel 36
Hot Rolled, Annealed Sheets 68–75
Hot Rolled Plates 56–58, 61–65
Hot Rolled Screw Stock (THREDWEL) 48
Hot Rolled Steel Sheets (Blue Annealed) 66, 67
Hot Rolled Strip Steel 36, 37

I Iron (Swedish) 47

K K-W Tool Steel (Carpenter) 175–181

L Lapweld Steel Tubes 110
Lawn Fences 260, 261

M Machinery Steels—POTTS JJ 38–46
—ELASTUF CHRO-MOLY 136, 137
—ELASTUF MEDIA 123, 124
—ELASTUF PENN 125–129
—ELASTUF S.A.E. 2335 ..... 130, 131
—ELASTUF S.A.E. 3140 132–135
—ELASTUF Type A 138–142

INDEX

Page

M MACWHYTE Slings....115–117
MACWHYTE Wire Rope....114, 118, 120
MAN-TEN....65B
Mechanical Flame Cutting....59, 60
MEDIA Machinery Steel....123, 124
Molybdenum Alloy....136, 137
Monarch Slings....116, 117

N Nails—Surgrip Roofing....80
Nickel, Alloy....132–135

O One-Pass C. R. Box Annealed Sheets....68
(Same as H. R. Annealed)
Ornamental Perforated Metal....53

P PAGE Fencing....260, 261
PENN Machinery Steel....125, 129
PENN Machinery Steel, Cold Finished....34, 35
Perforated Metals....53
Pfeifer Clips....80
Physical Properties....267
Plates—"AW" Floor Plates....56–58
—Diamond Pattern....56–58
—Ribbed....56–58
—Universal....61–63
—Sheared....61–63
—WEARTUF....65
—High Carbon....64
POTTSCO—Electrodes....81–99
—Welding Rods....100–103
—Welding Accessories....104–107
POTTS Hollow Drill Steel....145
POTTS JJ—Soft Steel Bars....38–46
POTTS Solid Drill Steel....145
POTTS SPECIAL Drill Rods....211–213
Precision Finished—MEDIA....32, 33

Q Quantity Extras....294, 295

R R.D.S. Tool Steel....188–191
Radiator Enclosure Metals....51, 53
RED TOP Accessories....52
RED TOP ECONO Expanded Metal....50–52
Reinforcing Bars....20
Reinforcing Fabric....49, 52
Ribbed Plate....56, 58
Roofing Clips....80
Roofing Corrugated Metal....78, 79
Roofing Nails....80
Rope, Wire....114, 120

S S.A.E. Specifications....268–270
S.A.E. 2335....130, 131
S.A.E. 3140....132–135
Saw Cutting Charges....296–308
Seamless Steel Tubes....110
Shafting—Cold Drawn....27–29
—Turned and Polished....29
—Turned, Ground and Polished....32, 33
Shear Cutting Charges....303
Sheared Plates....61–63
Sheets—Brass....109
—Copper....109
—Hot Rolled Steel....66, 67
—Hot Rolled Annealed....68
—Cold Rolled....69
—SUPREMO Auto Body....69
—Galvanized Steel....70, 71
—BETH-CU-LOY Copper Bearing....72, 73
—ARMCO Ingot Iron Galvanized....74, 76, 77
—Corrugated Galvanized....78, 79
SHELF-X Flat Mesh....50–52
Shields, Welding....106
Ship Channels....20
Siding, Corrugated Metal....78, 79
Siler Slings....115
Silico Manganese Spring Steel....47
610 Tool Steel (Carpenter)....197
Size Extras....292, 293
Slings....113–115, 117

INDEX

Page

S
Soft Steel Bars . . . 38–48
SOLAR Tool Steel (Carpenter) . . . 170–174
Special Beam Joists . . . 16
SPECIAL No. 11 Tool Steel (Carpenter) . . . 163–169
Specifications N.E.M.A. Electrodes . . . 82
Spring Steel . . . 47
Stainless and Heat Resisting Steels . . . 214
—Welding Rods . . . 99, 103
—Sheets USS 18-8 . . . 236–240
—Bars . . . 242–246
—Tubing . . . 249
—Pipe . . . 247, 248
—Castings . . . 234
Stair Stringer Channels . . . 18
Stair Treads . . . 55, 56
Stanchions . . . 16
Standard Beams . . . 14
STAR-ZENITH High Speed (Carpenter) . . . 198–203
Steel Plates . . . 56–58, 61–65
Steel Sheets . . . 66–73
STENTOR Tool Steel (Carpenter) . . . 182–187
Strip Steel . . . 36, 37
Structural Steel . . . 11, 13–18, 20
Super-Diamond Floor Plates . . . 56–58
SUPREMO Auto Body Sheets . . . 69
SURGRIP Roofing Nails . . . 80
Swedish Iron . . . 47

T
Tables—Comparative Hardness . . . 265
—Comparative Physical Properties . . . 266
—Use of Physical Properties . . . 267
—Equivalent Decimals . . . 272, 274, 275
—U. S. Standard Weights of Gauges . . . 273
—Pressure Boiler Tubes . . . 111
—Roofing and Siding . . . 79
—Tubes, Boiler . . . 110
—Standard Gauges . . . 272
Tees . . . 17
Temper Classification . . . 264
THREDWEL (H. R. Screw Stock) . . . 48
Tool Holder Bits . . . 203
Tool Steels . . . 143–213
Tough Timbre Tool Steel . . . 149
TROJAN Tool Steel . . . 144–147
Tubing—Stainless . . . 249
—Carpenter Welded . . . 249
—Babcock & Wilcox Seamless . . . 247
—Stainless Pipe . . . 247, 248
Type A Alloy Machinery Steel . . . 138–142

U
Union Cold Finished Steel . . . 21–35
Universal Mill Plates . . . 61–63
Useful Information . . . 262
U. S. G. Products . . . 50–52
USS COR-TEN . . . 65A
USS MAN-TEN . . . 65B
USS 18-8 Stainless Steel . . . 214, 235
USS Stainless and Heat Resisting Steels . . . 214, 235

W
Warehouse Customs . . . 8, 9
WEARTUF Plate . . . 65
Weights and Gauges . . . 272–291
Welded Wire Reinforcing Fabric . . . 49
Welding Accessories—Helmets . . . 106
—Flux . . . 105
—Hand Shields . . . 106
—Goggles . . . 106
—Lenses . . . 104–106
—Holders . . . 107
—Connectors . . . 107
—Gloves . . . 107
—Sleeves . . . 107
—Brushes . . . 107
—TIREX Wire and Cable . . . 105
Welding Rods—Electrodes . . . 81–99
—Oxy-Acetylene . . . 100–104
—POTTS SUREFLO Cast Iron . . . 101
Wide Flange Beams . . . 15
Wire Rope . . . 114, 120
Wrought Iron Fences . . . 260, 261

OFFICES, WAREHOUSE, GARAGE AND HEATING PLANT

East Erie Avenue and D Street, Philadelphia

FOUNDED 1815

Wm. L. Potts, 1815-1835
Wm. L. Potts & Son, 1835-1856
Thomas I. Potts, 1856-1865
Horace T. Potts, 1865-1883
Horace T. Potts & Co., 1883-1932
Horace T. Potts Co., Incorp., 1932-1935
Horace T. Potts Co., 1936

HORACE T. POTTS CO.

Harrison I. Potts
Thomas C. Potts
Horace M. Potts
Guy P. Bible
Morris E. Neeley
Arthur L. Collins
Claude Mengel
Thomas I. Potts
Horace T. Potts, 2nd

THE STEEL WAREHOUSE OF TODAY

The modern Steel Warehouse is not merely a place where large quantities of steel and steel products are stored, nor is its only function the ability to make quick deliveries. The successful warehouse of today must have a highly trained staff, with both sales initiative and complete engineering and technical knowledge—men eager to serve and with a keen regard for the customer's interest as their primary inspiration. To counsel and assist in the selection of the right material for each purpose calls for an intimate knowledge of the chemical, mechanical and functional problems involved. It has been our aim and constant endeavor to perfect such an organization.

Such a warehouse must also have as complete a stock as is possible of the almost limitless range of grades, kinds and qualities that have been developed to meet the varied demands of modern industry. All the materials herein listed are of the highest quality and workmanship that we have been able to obtain. Our service facilities enumerated are likewise the most complete and up-to-date.

We believe the comprehensive information gathered here will prove of much benefit to the regular as well as occasional buyer of steel and other metals.

We would record our keen appreciation of the patronage extended to us in the past, and express the hope that we may merit the opportunity for further service.

The 123rd Year of Warehouse Service

WAREHOUSE CUSTOMS

Sales:

Sales are made subject to strikes, accidents or other unavoidable delays.

Cancellations:

Orders are not subject to cancellation except by our consent.

Deliveries:

Materials from Warehouse are usually shipped same day order is received. On special material, or where some preparation must be made in our warehouse, deliveries are subject to possible delays, but extra care and attention are given to these orders. Orders for mill shipment are based upon mill schedules. The intimate knowledge we have at all times of mill conditions enables us to often give the earliest delivery possible. Sufficient allowance should be made, however, for unavoidable delays.

Telephone Orders:

We have a specially trained force to receive telephone orders. The utmost care should be used in transmitting these and repetition made to avoid error.

Confirming Orders:

If not so marked, we are not responsible for any expense by reason of duplication.

Boxing:

We box and charge at cost all shipments which in our judgment require this protection during transportation. This would include small lots that cannot be properly handled otherwise.

WAREHOUSE CUSTOMS

Defective Materials:

We will replace any material proving defective, but under no circumstances will we allow or be responsible for damages or labor or other costs.

Returns:

No returns will be accepted unless definite arrangements have been made with us before materials are sent back. All such materials must be in good condition and labor and other costs will be charged where we are not at fault. When complaint is made, full opportunity must be given our Engineering and Metallurgical Department to ascertain if materials in question are being properly handled.

Cash Orders:

Cash or C. O. D. orders for special or cut materials will not be accepted without a cash deposit.

Extras:

All extras given are in cents per lb.

Intermediate sizes take next higher extra.

Responsibility for Damaged Goods:

Our responsibility ceases upon obtaining a receipt from transportation company, showing materials in good order when received.

Quotations:

All quotations are subject to change without notice.

ANGLES—Equal Leg

BAR SIZES

Use "STEEL BAR" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
½ x ½ x ⅛	.38	2.20	20
⅝ x ⅝ x ⅛	.48	1.50	20
¾ x ¾ x ⅛	.59	.60	20
3/16	.90	.45	20
⅞ x ⅞ x ⅛	.70	.40	20
*1 x 1 x ⅛	.80	.30	22
1 x 1 x ⅛	.80	.30	22
3/16	1.16	.25	22
¼	1.49	.25	22
1⅛ x 1⅛ x ⅛	.91	.30	22
1¼ x 1¼ x ⅛	1.01	.30	22
3/16	1.48	.25	22
¼	1.92	.25	22
1½ x 1½ x ⅛	1.23	.25	22
3/16	1.80	.15	22
¼	2.34	.15	22
5/16	2.86	.15	22
⅜	3.35	.15	22
1¾ x 1¾ x ⅛	1.44	.25	22
3/16	2.12	.15	22
¼	2.77	.15	22
5/16	3.39	.15	22
2 x 2 x ⅛	1.65	.25	22
3/16	2.44	.15	22
¼	3.19	.15	22–40
5/16	3.92	.15	22
⅜	4.70	.15	22–40
½	6.00	.15	40
2½ x 2½ x ⅛	2.08	.25	22
3/16	3.07	.15	22
¼	4.10	.15	22–40
5/16	5.00	.15	22–40
⅜	5.90	.15	22–40
½	7.70	.15	22–40

*Square Root Angles: Add .10 Extra to Base Price.

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

It's true economy to buy your steel from warehouse. You get just what you want—no more—no less.

ANGLES—Equal Leg

STRUCTURAL SIZES

Use "STRUCTURAL" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
3 x 3 x 1/8	2.50	.50	22
3/16	3.71	.35	22
1/4	4.9	Base	5–40
5/16	6.1	Base	5–40
3/8	7.2	Base	5–40
1/2	9.4	Base	5–40
5/8	11.5	Base	5–40
3½ x 3½ x 1/4	5.8	Base	5–40
5/16	7.2	Base	5–40
3/8	8.5	Base	5–40
1/2	11.1	Base	5–40
5/8	13.6	Base	5–40
3/4	16.0	Base	5–40
4 x 4 x 1/4	6.6	Base	5–40
5/16	8.2	Base	5–40
3/8	9.8	Base	5–40
1/2	12.8	Base	5–40
5/8	15.7	Base	5–40
3/4	18.5	Base	5–40
5 x 5 x 5/16	10.3	.10	5–40
3/8	12.3	Base	5–40
1/2	16.2	Base	5–40
5/8	20.0	Base	5–40
6 x 6 x 5/16	12.5	.10	5–40
3/8	14.9	Base	5–40
1/2	19.6	Base	5–40
5/8	24.2	Base	5–40
3/4	28.7	Base	5–40
7/8	33.1	Base	5–40
1	37.4	Base	5–40
8 x 8 x 1/2	26.4	.10	5–40
5/8	32.7	.10	5–40
3/4	38.9	.10	5–40
1	51.0	.10	5–40
1⅛	56.9	.10	5–40

Fabricated materials and sizes not listed can be furnished promptly.

Warehouse Quantity Extras and Deductions: Page 295.

Structural sizes cut to 5 feet or longer without charge.

Warehouse Cutting Extras (under 5 feet): Pages 303-304.

STEEL TODAY
FOR TODAY'S NEEDS

ANGLES—Unequal Leg

BAR SIZES

Use "STEEL BAR" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
1 x 5/8 x 1/8	.60	.60	22
1 x 3/4 x 1/8	.70	.60	22
1 3/8 x 7/8 x 1/8	.91	.40	22
3/16	1.32	.35	22
1 3/4 x 1 1/4 x 1/8	1.23	.30	22
1/4	2.34	.25	22
2 x 1 1/4 x 3/16	1.96	.25	22
1/4	2.55	.25	22
2 x 1 1/2 x 1/8	1.44	.25	22
3/16	2.12	.15	22
1/4	2.77	.15	22
2 1/2 x 1 1/2 x 3/16	2.44	.20	22
1/4	3.19	.20	22
2 1/2 x 2 x 1/8	1.86	.25	22
3/16	2.75	.15	22
1/4	3.62	.15	22
5/16	4.50	.15	22
3/8	5.30	.15	22

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

TELEPHONE ORDERS

Our Telephone Order Desks are intelligently manned. Prompt and correct deliveries result.

Telephone { REGent 7450
Park 5351

GIVE US A CALL!

ANGLES—Unequal Leg

STRUCTURAL SIZES

Use "STRUCTURAL" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
3 x 2 x 3/16	3.10	.35	22
1/4	4.1	Base	5–40
5/16	5.0	Base	5–40
3/8	5.9	Base	5–40
1/2	7.7	Base	5–40
3 x 2 1/2 x 1/4	4.5	Base	5–40
5/16	5.6	Base	5–40
3/8	6.6	Base	5–40
1/2	8.5	Base	5–40
3 1/2 x 2 1/2 x 1/4	4.9	Base	5–40
5/16	6.1	Base	5–40
3/8	7.2	Base	5–40
1/2	9.4	Base	5–40
3 1/2 x 3 x 1/4	5.4	Base	5–40
5/16	6.6	Base	5–40
3/8	7.9	Base	5–40
1/2	10.2	Base	5–40
4 x 3 x 1/4	5.8	Base	5–40
5/16	7.2	Base	5–40
3/8	8.5	Base	5–40
1/2	11.1	Base	5–40
5/8	13.6	Base	5–40
4 x 3 1/2 x 5/16	7.7	Base	5–40
3/8	9.1	Base	5–40
5 x 3 x 5/16	8.2	Base	5–40
3/8	9.8	Base	5–40
1/2	12.8	Base	5–40
5/8	15.7	Base	5–40
5 x 3 1/2 x 5/16	8.7	Base	5–40
3/8	10.4	Base	5–40
1/2	13.6	Base	5–40
5 x 4 x 3/8	11.0	Base	5–40
1/2	14.5	Base	5–40
6 x 3 1/2 x 5/16	9.8	.10	5–40
3/8	11.7	Base	5–40
1/2	15.3	Base	5–40
5/8	18.9	Base	5–40
3/4	22.4	Base	5–40
6 x 4 x 5/16	10.3	.10	5–40
3/8	12.3	Base	5–40
1/2	16.2	Base	5–40
5/8	20.0	Base	5–40
3/4	23.6	Base	5–40
7/8	27.2	Base	5–40
7 x 4 x 3/8	13.5	.10	5–40
1/2	17.9	.10	5–40
8 x 4 x 1/2	19.6	.10	5–40

Structural sizes cut to 5 feet or longer without charge.
Warehouse Cutting Extras (under 5 feet): Pages 303-304.

STANDARD BEAMS

STRUCTURAL SIZES

Use "STRUCTURAL" Base Price

Size Inches	Estimated Weight Per Foot	Web Thickness	Flange Width	Net Extra For Size	Stock Lengths Feet
3	5.7	.170	2.330	Base	5–40
	7.5	.349	2.509	Base	5–40
4	7.7	.190	2.660	Base	5–40
	8.5	.253	2.723	Base	5–40
	9.5	.326	2.796	Base	5–40
	10.5	.400	2.870	Base	5–40
5	10.0	.210	3.000	Base	5–60
	12.25	.347	3.137	Base	5–60
	14.75	.494	3.284	Base	5–60
6	12.5	.230	3.330	Base	5–60
	14.75	.343	3.443	Base	5–60
	17.25	.465	3.565	Base	5–60
7	15.3	.250	3.660	Base	5–60
	20.0	.450	3.860	Base	5–60
8	18.4	.270	4.000	Base	5–60
	20.5	.349	4.079	Base	5–60
	25.5	.532	4.262	Base	5–60
10	25.4	.310	4.660	Base	5–60
	30.0	.447	4.797	Base	5–60
	35.0	.594	4.944	Base	5–60
	40.0	.741	5.091	Base	5–60
12	31.8	.350	5.000	Base	5–60
	40.8	.460	5.250	Base	5–60
	50.0	.687	5.477	Base	5–60
	55.0	.810	5.600	Base	5–60
15	42.9	.410	5.500	Base	5–60
	50.0	.550	5.640	Base	5–60
	55.0	.648	5.738	Base	5–60
	60.8	.590	6.000	Base	5–60
18	54.7	.460	6.000	.10	5–60
	60.0	.547	6.087	.10	5–60
	70.0	.711	6.251	.10	5–60
20	81.4	.600	7.000	.10	5–60
24	100.0	.747	7.247	.10	5–60

Warehouse Quantity Extras and Deductions: Page 295.

Structural sizes cut to 5 feet or longer without charge.

Warehouse Cutting Extras (under 5 feet): Pages 303-304.

Our Warehouse should be YOUR Steel Storeroom. Buy exactly what you need of each size and grade—when you need it. We will get it to you on time

WIDE FLANGE BEAMS

Use "STRUCTURAL" Base Price

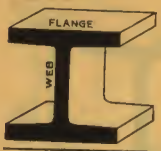
Size Inches	Estimated Weight Per Foot	Web Thickness	Flange Width	Net Extra For Size	Stock Lengths Feet
8	17	.230	5.25	.05	5–60
	21	.252	5.272	.05	5–60
10	21	.240	5.75	.05	5–60
	23	.240	5.75	.05	5–60
	29	.289	5.799	.05	5–60
12	25	.240	6.50	.05	5–60
	28	.240	6.50	.05	5–60
	32	.273	6.533	.05	5–60
	36	.305	6.565	.05	5–60
14	30	.270	6.733	.05	5–60
	34	.287	6.75	.05	5–60
	38	.313	6.76	.05	5–60
	42	.338	6.801	.05	5–60
16	36	.299	6.992	.05	5–60
	40	.307	7.00	.05	5–60
	45	.346	7.039	.05	5–60
	50	.380	7.073	.05	5–60
18	47	.350	7.492	.15	5–60
	50	.358	7.50	.15	5–60
	55	.390	7.532	.15	5–60
	64	.403	8.715	.15	5–60
	77	.475	8.787	.15	5–60
	96	.512	11.75	.15	5–60
21	59	.390	8.230	.15	5–60
	68	.430	8.270	.15	5–60
	82	.499	8.962	.15	5–60
	112	.527	13.00	.15	5–60
24	74	.430	8.975	.15	5–60
	87	.480	9.025	.15	5–60
	100	.468	12.00	.15	5–60
	120	.556	12.088	.15	5–60
27	91	.483	9.983	.15	5–60
	106	.535	10.035	.15	5–60
30	108	.564	10.484	.15	5–60
	124	.585	10.521	.15	5–60

Warehouse Quantity Extras and Deductions: Page 295.

Structural sizes cut to 5 feet or longer without charge.

Warehouse Cutting Extras (under 5 feet): Pages 303-304.

STEEL TODAY FOR TODAY'S NEEDS



H BEAMS

Use "STRUCTURAL" Base Price

Size Inches	Estimated Weight Per Foot	Web Thickness	Flange Width	Net Extra For Size	Stock Lengths Feet
4	13.8	.313	4.00	.10	5–40
5	18.9	.313	5.00	.10	5–60
6	20	.250	6.00	.10	5–60
	23	.275	6.12	.10	5–60
	30	.350	6.38	.10	5–60
8	31	.290	8.00	.10	5–60
	35	.315	8.025	.10	5–60
	40	.365	8.25	.10	5–60
	48	.405	8.50	.10	5–60
10	49	.340	10.00	.10	5–60
	54	.370	10.12	.10	5–60
	60	.415	10.25	.10	5–60
	72	.510	10.17	.10	5–60
12	65	.390	12.00	.10	5–60
	72	.430	14.040	.10	5–60
	79	.470	12.08	.10	5–60
14	87	.420	14.50	.10	5–60
8/6.5	24	.240	6.50	.10	5–60
	27	.275	6.535	.10	5–60
10/8	33	.295	7.965	.10	5–60
	37	.305	7.975	.10	5–60
	41	.328	8.00	.10	5–60
	45	.350	8.022	.10	5–60
	50	.371	8.077	.10	5–60
12/8	40	.295	8.00	.10	5–60
	45	.336	8.042	.10	5–60
12/10	53	.340	10.00	.10	5–60
	64	.405	10.06	.10	5–60
14/8	43	.308	8.00	.10	5–60

STANCHIONS

4	10.0	.265	4.00	.15	
6	15.5	.240	6.00	.15	

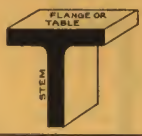
SPECIAL BEAM JOISTS

8	13.0	.23	4.000	.10	
10	15.0	.23	4.000	.10	
12	16.5	.23	4.000	.10	

Structural sizes cut to 5 feet or longer without charge.
Warehouse Cutting Extras (under 5 feet): Pages 303-304.

TEES

BAR SIZES



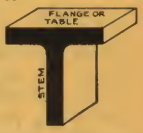
Use "STEEL BAR" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
¾ x ¾ x ⅛	.61	1.10	20
1 x 1 x ⅛	.81	.70	22
1¼ x 1¼ x 3/16	1.55	.55	22
1½ x 1½ x 3/16	1.90	.30	22
¼	2.43	.30	22
1¾ x 1¾ x 3/16	2.26	.30	22
¼	2.90	.30	22
2 x 2 x ¼	3.56	.30	22
2¼ x 2¼ x ¼	4.10	.30	22
2½ x 1¼ x ¼	3.30	.55	22
2½ x 2½ x 5/16	5.50	.30	22
⅜	6.40	.30	22

Warehouse Cutting Extras: Pages 303-304.

TEES

STRUCTURAL SIZES



Use "STRUCTURAL" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
3 x 2½ x 5/16	6.1	.10	5–40
3 x 3 x 5/16	6.7	.10	5–40
⅜	7.8	.10	5–40
3½ x 3 x ⅜	8.5	.10	5–40
3½ x 3½ x ⅜	9.2	.10	5–40
4 x 2 x 5/16	6.7	.10	5–40
4 x 2½ x ⅜	8.5	.10	5–40
4 x 3 x ⅜	9.2	.10	5–40
4 x 4 x ⅜	10.5	.10	5–40
½	13.5	.10	5–40
4 x 5 x ⅜	11.9	.10	5–40
5 x 3 x ⅜	11.5	.10	5–40
6 x 4½ x 15/16	28.2	.10	5–40

Warehouse Quantity Extras and Deductions: Page 295.
Structural sizes cut to 5 feet or longer without charge.
Warehouse Cutting Extras (under 5 feet): Pages 303-304.

CHANNELS
BAR SIZES

Use "STEEL BAR" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
½ x 15/64 x 7/64	.26	2.50	20
⅝ x 5/16 x ⅛	.43	1.70	20
¾ x ⅜ x ⅛	.56	.60	20
⅞ x ⅜ x ⅛	.65	.60	20
1 x ⅜ x ⅛	.68	.50	20
1 x ½ x ⅛	.83	.50	20
1¼ x ½ x ⅛	1.01	.50	20
3/16	1.18	.40	20
1½ x ½ x ⅛	1.12	.40	22
1½ x 9/16 x 3/16	1.44	.25	22
1½ x ¾ x ⅛	1.17	.40	22
1¾ x ½ x 3/16	1.55	.25	22
2 x ½ x ⅛	1.47	.40	22
2 x ⅝ x 3/16	1.98	.25	22
2 x 1 x 3/16	2.57	.25	22
2 x 1.09 x 7/32	2.90	.25	22
2½ x ⅝ x 3/16	2.27	.25	22

BOX CHANNELS

Use "STEEL BAR" Base Price

1½ x ¾ x ⅛	1.17	.40	20
1½ x 1½ x 3/16	2.63	.40	20

SPECIAL STAIR STRINGER CHANNELS

Size Inches	Estimated Weight Per Foot	Web Thickness	Flange Width	Net Extra For Size
10	8.4	.170	1.500	Subject to Quotation
12	10.6	.1875	1.500	

Warehouse Cutting Extras: Pages 303-304.

CHANNELS

STRUCTURAL SIZES

Use "STRUCTURAL" Base Price

Size Inches	Estimated Weight Per Foot	Web Thickness	Flange Width	Net Extra For Size	Stock Lengths Feet
3	4.1	.170	1.410	Base	5–40
	5.0	.258	1.498	Base	5–40
	6.0	.356	1.596	Base	5–40
4	5.4	.180	1.580	Base	5–40
	6.25	.247	1.647	Base	5–40
	7.25	.320	1.720	Base	5–40
5	6.7	.190	1.750	Base	5–60
	9.0	.325	1.885	Base	5–60
	11.5	.472	2.032	Base	5–60
6	8.2	.200	1.920	Base	5–60
	10.5	.314	2.034	Base	5–60
	13.0	.437	2.157	Base	5–60
	15.5	.559	2.279	Base	5–60
7	9.8	.210	2.090	Base	5–60
	12.25	.314	2.194	Base	5–60
	14.75	.419	2.299	Base	5–60
	17.25	.524	2.404	Base	5–60
8	11.5	.220	2.260	Base	5–60
	13.75	.303	2.343	Base	5–60
	16.25	.395	2.435	Base	5–60
	18.75	.487	2.527	Base	5–60
	21.25	.579	2.619	Base	5–60
9	13.4	.230	2.430	Base	5–60
	15.0	.285	2.485	Base	5–60
	20.0	.452	2.652	Base	5–60
	25.0	.612	2.812	Base	5–60
10	15.3	.240	2.600	Base	5–60
	20.0	.379	2.739	Base	5–60
	25.0	.526	2.886	Base	5–60
	30.0	.673	3.033	Base	5–60
	35.0	.820	3.180	Base	5–60
12	20.7	.280	2.940	Base	5–60
	25.0	.387	3.047	Base	5–60
	30.0	.510	3.170	Base	5–60
	35.0	.636	3.296	Base	5–60
	40.0	.755	3.415	Base	5–60
15	33.9	.400	3.400	Base	5–60
	40.0	.520	3.520	Base	5–60
	50.0	.716	3.716	Base	5–60

Structural sizes cut to 5 feet or longer without charge.
Warehouse Cutting Extras (under 5 feet): Pages 303-304.

STEEL TODAY
FOR TODAY'S NEEDS

SHIP CHANNELS

Use "STRUCTURAL" Base Price

Size Inches	Estimated Weight Per Foot	Web Thickness	Flange Width	Net Extra For Size	Stock Lengths Feet
6	12.0	.313	2.50	Base	5–60
	15.3	.340	3.50	Base	5–60
	20.0	.475	3.60	Base	5–60
7	19.1	.350	3.45	Base	5–60
	20.3	.400	3.50	Base	5–60
8	19.3	.375	3.00	Base	5–60
	22.8	.425	3.50	Base	5–60
9	25.4	.450	3.50	Base	5–60
10	21.9	.325	3.45	Base	5–60
	26.6	.425	3.45	Base	5–60
	30.2	.475	4.00	Base	5–60
12	36.5	.525	4.00	Base	5–60

CAR BUILDING CHANNELS

Use "STRUCTURAL" Base Price

3	5.8	.180	1.805	Base
	7.1	.313	1.938	Base
4	13.8	.500	2.500	.10
7	18.8	.350	4.000	.15
13	31.8	.375	4.000	Base
	37.0	.492	4.117	Base
	50.0	.787	4.412	Base
	55.0	.900	4.53	Base
18	45.8	.500	4.000	.10
	58.0	.700	4.200	.10

Structural sizes cut to 5 feet or longer without charge.
Warehouse Cutting Extras (under 5 feet): Pages 303-304.

DEFORMED CONCRETE REINFORCING BARS

(New Billet Stock)

ROUNDS

Size Inches	Estimated Weight in Pounds Per Foot	Area in Sq. In.	Perimeter Inches	Net Extra For Size	Stock Lengths Feet
3/8	0.376	0.1104	1.178	.40	40
1/2	0.668	0.1963	1.571	.20	40
5/8	1.043	0.3068	1.964	.10	40
3/4	1.502	0.4418	2.356	Base	40
7/8	2.044	0.6013	2.749	Base	40
1	2.670	0.7854	3.142	Base	40

SQUARES

1/2	0.850	0.2500	2.00	.20	40
1	3.400	1.0000	4.00	Base	40
1 1/8	4.303	1.2656	4.50	Base	40
1 1/4	5.313	1.5625	5.00	Base	40

Plain round and square bars of any grade of new billet steel and deformed or plain bars of re-rolled rail steel can be furnished promptly from Mill.

We cut to length and bend according to requirements.

Warehouse Quantity Extras and Deductions: Page 295.

Union Cold Finished Steels

The steels listed in this section are noted for their excellent surface, straightness and accuracy to size. Careful mill control assures constant uniformity of structure and analysis, two factors of utmost importance in machining.

Physical Properties:

BESSEMER — **SCREW STOCK**		— OPEN HEARTH
S. A. E. 1112 As Cold Drawn		S. A. E. 1120 As Cold Drawn
80/100,000 lbs. per 70/ 90,000 sq. in.	Tensile Strength	70/85,000 lbs. per 55/70,000 sq. in.
10/20%	Yield Point	12/20%
35/50%	Elong. in 2"	40/55%
166/196	Red. of Area	40/55%
	Brinell	143/179

S. A. E. X-1020—**OPEN HEARTH**—		S. A. E. X-1020
Flats As Cold Drawn		Shafting Sizes Turned and Polished
80/95,000 lbs. per 70/80,000 sq. in.	Tensile Strength	55/65,000 lbs. per 30/40,000 sq. in.
10/25%	Yield Point	25/35%
40/50%	Elong. in 2"	45/55%
170/200	Red. of Area	45/55%
	Brinell	130/170

(All physical properties shown are average, and cannot be guaranteed. Finishing temperatures, permissible variation in analysis, and size, each may cause a change in physicals.)

Machinability: Screw Stock combines in analysis and method of production those fundamentals which make for free-cutting. It should be specified wherever excellent machinability on automatics, turrets and milling machines is required.

Warping in Machining: All Cold Finished Steels produced by Cold Drawing have a tendency to warp in machining, as a cut in the drawn surface will release strains and often cause distortion. This is not true of Cold Finished Steels produced by Turning and Polishing or Turning and Grinding. (To overcome warping use **Precision Finish Elastuf Media.** Pages 32-33.)

Heat Treatment: Ordinarily Screw Stock should not be used for carburizing, as the analysis is not well suited for this operation.

Precision Finish Elastuf Media should be used where heat treatment is desired, that is, a quench and a draw without carburizing. (Pages 32-33.)

PRECISION FINISH
ELASTUF MEDIA
PAGES 32-33

COLD FINISHED
ELASTUF PENN
PAGES 34-35

Page No.
Precision Finish ELASTUF MEDIA 32-33
Cold Finished ELASTUF PENN 34-35
COLD FINISHED
H. R. STRIP
POTTS JJ Soft Steel Bars
Thredwel
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLO
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND
T RESISTING
STEELS
IDEX
ical Data
UGES AND
EIGHTS
xtras for
ize and
uantity
ITTING
XTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED STEEL

Grade—Cold Drawn, S. A. E. X1020

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
1/8x 3/16	8.50	.079	.95	10–12
1/4	8.50	.106	1.27	10–12
5/16	6.50	.132	1.58	10–12
3/8	6.50	.159	1.91	10–12
1/2	6.50	.212	2.54	10–12
9/16	5.50	.239	2.87	10–12
5/8	5.50	.265	3.18	10–12
3/4	4.50	.318	3.82	10–12
7/8	4.50	.371	4.45	10–12
1	4.50	.425	5.10	10–12
1 1/8	3.50	.478	5.74	10–12
1 1/4	3.50	.531	6.37	10–12
1 3/8	3.50	.584	7.01	10–12
1 1/2	3.50	.637	7.64	10–12
1 3/4	3.00	.743	8.92	10–12
2	3.00	.850	10.20	10–12
2 1/4	3.00	.956	11.47	10–12
2 1/2	3.00	1.063	12.76	10–12
3	3.00	1.275	15.30	10–12
3/16x 1/4	7.75	.159	1.91	10–12
5/16	5.75	.199	2.39	10–12
3/8	5.75	.239	2.87	10–12
1/2	5.75	.318	3.82	10–12
5/8	5.25	.398	4.78	10–12
3/4	3.75	.478	5.74	10–12
7/8	3.75	.557	6.68	10–12
1	3.75	.637	7.64	10–12
1 1/8	2.75	.717	8.60	10–12
1 1/4	2.75	.796	9.55	10–12
1 1/2	2.75	.956	11.47	10–12
1 3/4	1.75	1.116	13.39	10–12
2	1.75	1.275	15.30	10–12
2 1/4	1.75	1.434	17.21	10–12
2 1/2	1.75	1.594	19.13	10–12
2 3/4	1.75	1.753	21.04	10–12
3	1.75	1.913	22.96	10–12
3 1/2	3.00	2.231	26.77	10–12
4	3.00	2.550	30.60	10–12
1/4x 5/16	5.75	.265	3.18	10–12
3/8	5.75	.318	3.82	10–12
1/2	5.75	.425	5.10	10–12
5/8	5.25	.531	6.37	10–12
3/4	3.75	.637	7.64	10–12
7/8	3.75	.743	8.92	10–12
1	3.75	.850	10.20	10–12
1 1/8	2.75	.956	11.47	10–12
1 1/4	2.75	1.063	12.76	10–12
1 3/8	2.75	1.169	14.03	10–12
1 1/2	2.75	1.275	15.30	10–12
1 3/4	1.75	1.488	17.86	10–12
2	1.75	1.700	20.40	10–12

Warehouse Quantity Extras on Cold Finished Bars: Page 295.

Warehouse Cutting Extras: Page 299.

COLD FINISHED STEEL

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

Grade—Cold Drawn, S. A. E. X1020

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
¼x2¼	1.75	1.913	22.96	10–12
2½	1.75	2.125	25.50	10–12
2¾	1.75	2.338	28.06	10–12
3	1.75	2.550	30.60	10–12
3¼	3.00	2.763	33.16	10–12
3½	3.00	2.975	35.70	10–12
4	3.00	3.400	40.80	10–12
5	3.00	4.250	51.00	10–12
6	3.00	5.100	61.20	10–12
5/16x ⅜	5.75	.398	4.78	10–12
½	5.75	.531	6.37	10–12
⅝	5.25	.664	7.97	10–12
¾	3.75	.796	9.55	10–12
⅞	3.75	.929	11.15	10–12
1	3.75	1.063	12.76	10–12
1⅛	2 75	1.195	14.34	10–12
1¼	2.75	1.328	15.94	10–12
1⅜	2.75	1.461	17.53	10–12
1½	2.75	1.594	19.13	10–12
1¾	1.75	1.859	22.31	10–12
2	1.75	2.125	25.50	10–12
2¼	1.75	2.391	28.69	10–12
2½	1.75	2.656	31.87	10–12
2¾	1.75	2.922	35.06	10–12
3	1.75	3.188	38.26	10–12
3½	3.00	3.719	44.63	10–12
4	3.00	4.250	51.00	10–12
⅜x ½	4.75	.637	7.64	10–12
⅝	4.25	.796	9.55	10–12
¾	2.75	.956	11.47	10–12
⅞	2.75	1.116	13.39	10–12
1	2.75	1.275	15.30	10–12
1⅛	2.75	1.434	17.21	10–12
1¼	2.75	1.594	19.13	10–12
1⅜	2.75	1.753	21.04	10–12
1½	2.75	1.913	22.96	10–12
1⅝	1.75	2.072	24.86	10–12
1¾	1.75	2.231	26.77	10–12
2	1.75	2.550	30.60	10–12
2¼	1.75	2.869	34.43	10–12
2½	1.75	3.188	38.26	10–12
2¾	1.75	3.506	42.07	10–12
3	1.75	3.825	45.90	10–12
3¼	2.50	4.150	49.80	10–12
3½	2.50	4.463	53.56	10–12
4	2.50	5.100	61.20	10–12
5	2.50	6.375	76.50	10–12
6	2.50	7.650	91.80	10–12
8	Base	10.200	122.40	10–12
10	Base	12.750	153.00	10–12
12	Base	15.300	183.60	10–12

Warehouse Quantity Extras on Cold Finished Bars: Page 295.

H. R. STRIP
POTTS JJ Soft Steel Bars
Thredwel
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
APBON & ALL
STEELS
TOOL STEELS
DRILL RODS
TAINLESS AND
T RESISTIN
STEELS
DEX
ical Data
GES AND
EIGHTS
xtras for
ize and
uantity
TTING
TRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED STEEL

Grade—Cold Drawn, S. A. E. X1020

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
7/16" x 1/2	4.75	.743	8.92	10–12
5/8	4.25	.929	11.15	10–12
3/4	2.75	1.116	13.39	10–12
7/8	2.75	1.302	15.62	10–12
1	2.75	1.488	17.86	10–12
1 1/8	2.75	1.673	20.08	10–12
1 1/4	2.75	1.859	22.31	10–12
1 1/2	2.75	2.231	26.77	10–12
1 3/4	1.75	2.603	31.24	10–12
2	1.75	2.975	35.70	10–12
2 1/2	1.75	3.719	44.63	10–12
3	1.75	4.463	53.56	10–12
1/2 x 5/8	3.25	1.063	12.76	10–12
3/4	1.75	1.275	15.30	10–12
7/8	1.75	1.488	17.86	10–12
1	1.75	1.700	20.40	10–12
1 1/8	1.75	1.912	22.94	10–12
1 1/4	1.75	2.125	25.50	10–12
1 3/8	1.75	2.338	28.06	10–12
1 1/2	1.75	2.550	30.60	10–12
1 3/4	1.50	2.975	35.70	10–12
2	1.50	3.400	40.80	10–12
2 1/4	1.50	3.825	45.90	10–12
2 1/2	1.50	4.250	51.00	10–12
2 3/4	1.50	4.675	56.10	10–12
3	1.50	5.100	61.20	10–12
3 1/4	2.50	5.525	66.30	10–12
3 1/2	2.50	5.950	71.40	10–12
4	2.50	6.800	81.60	10–12
5	2.50	8.500	102.00	10–12
6	2.50	10.200	122.40	10–12
8	Base	13.600	163.20	10–12
10	Base	17.000	204.00	10–12
12	Base	20.400	244.80	10–12
9/16 x 5/8	3.25	1.195	14.34	10–12
3/4	1.75	1.434	17.21	10–12
7/8	1.75	1.673	20.08	10–12
1	1.75	1.913	22.96	10–12
1 1/8	1.75	2.152	25.82	10–12
1 1/4	1.75	2.391	28.69	10–12
1 1/2	1.75	2.869	34.43	10–12
1 3/4	1.50	3.347	40.16	10–12
2	1.50	3.825	45.90	10–12
5/8 x 3/4	1.50	1.594	19.13	10–12
7/8	1.50	1.859	22.31	10–12
1	1.50	2.125	25.50	10–12
1 1/8	1.50	2.390	28.68	10–12
1 1/4	1.50	2.656	31.87	10–12
1 3/8	1.50	2.922	35.06	10–12
1 1/2	1.50	3.188	38.26	10–12
1 3/4	1.50	3.719	44.63	10–12
2	1.50	4.250	51.00	10–12
2 1/4	1.50	4.781	57.37	10–12

Warehouse Quantity Extras on Cold Finished Bars: Page 295.

HORACE T. POTTS CO.

COLD FINISHED STEEL

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

Grade—Cold Drawn, S. A. E. X1020

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
5/8 x 2 1/2	1.50	5.313	63.76	10–12
2 3/4	1.50	5.844	70.13	10–12
3	1.50	6.375	76.50	10–12
3 1/2	2.50	7.438	89.26	10–12
4	2.50	8.500	102.00	10–12
6	2.50	12.750	153.00	10–12
8	Base	17.000	204.00	10–12
10	Base	21.250	255.00	10–12
12	Base	25.500	306.00	10–12
11/16 x 3/4	1.50	1.753	21.04	10–12
7/8	1.50	2.045	24.54	10–12
1	1.50	2.338	28.06	10–12
1 1/8	1.50	2.630	31.56	10–12
1 1/4	1.50	2.922	35.06	10–12
1 1/2	1.50	3.506	42.07	10–12
3/4 x 7/8	1.50	2.231	26.77	10–12
1	1.50	2.550	30.60	10–12
1 1/8	1.50	2.868	34.42	10–12
1 1/4	1.50	3.188	38.26	10–12
1 3/8	1.50	3.506	42.07	10–12
1 1/2	1.50	3.825	45.90	10–12
1 3/4	1.50	4.463	53.56	10–12
2	1.50	5.100	61.20	10–12
2 1/4	1.50	5.738	68.86	10–12
2 1/2	1.50	6.375	76.50	10–12
2 3/4	1.50	7.013	84.16	10–12
3	1.50	7.650	91.80	10–12
3 1/2	2.50	8.925	107.10	10–12
4	2.50	10.200	122.40	10–12
5	2.50	12.750	153.00	10–12
6	2.50	15.300	183.60	10–12
8	Base	20.400	244.80	10–12
10	Base	25.500	306.00	10–12
12	Base	30.600	367.20	10–12
7/8 x 1	1.50	2.975	35.70	10–12
1 1/8	1.50	3.346	40.15	10–12
1 1/4	1.50	3.719	44.63	10–12
1 1/2	1.50	4.463	53.56	10–12
1 3/4	1.50	5.206	62.47	10–12
2	1.50	5.950	71.40	10–12
1 x 1 1/8	1.50	3.825	45.90	10–12
1 1/4	1.50	4.250	51.00	10–12
1 3/8	1.50	4.675	56.10	10–12
1 1/2	1.50	5.100	61.20	10–12
1 3/4	1.50	5.950	71.40	10–12
2	1.50	6.800	81.60	10–12
2 1/4	1.50	7.650	91.80	10–12
2 1/2	1.50	8.500	102.00	10–12
2 3/4	1.50	9.350	112.20	10–12

Warehouse Quantity Extras on Cold Finished Bars: Page 295.

H. R. STRIP
POTTS JJ Soft Steel Bars
Thredwel
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLO
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND RESISTING STEELS
IDEX
ical Data
UGES AND
VEIGHTS
Extras for Size and Quantity
UTTING
XTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED STEEL

Grade—Cold Drawn, S. A. E. X1020

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
1 x 3	1.50	10.200	122.40	10–12
3½	2.50	11.900	142.80	10–12
4	2.50	13.600	163.20	10–12
5	2.50	17.000	204.00	10–12
6	2.50	20.400	244.80	10–12
8	Base	27.200	336.40	10–12
10	Base	34.000	408.00	10–12
12	Base	40.800	489.60	10–12
1⅛ x 1¼	1.50	4.781	57.37	10–12
1½	1.50	5.738	68.86	10–12
1¾	1.50	6.694	80.33	10–12
2	1.50	7.650	91.80	10–12
2¼	1.50	8.606	103.27	10–12
2½	1.50	9.563	114.76	10–12
3	1.50	11.480	137.76	10–12
1¼ x 1½	1.50	6.375	76.50	10–12
1¾	1.50	7.438	89.26	10–12
2	1.50	8.500	102.00	10–12
2¼	1.50	9.563	114.76	10–12
2½	1.50	10.630	127.56	10–12
3	1.50	12.750	153.00	10–12
1½ x 1¾	1.50	8.925	107.10	10–12
2	1.50	10.200	122.40	10–12
2¼	1.50	11.480	137.76	10–12
2½	1.50	12.750	153.00	10–12
3	1.50	15.300	183.60	10–12
3½	2.50	17.850	214.20	10–12
4	2.50	20.400	244.80	10–12
1¾ x 2	1.50	11.900	142.80	10–12
2¼	1.50	13.390	160.68	10–12
2½	1.50	14.880	178.56	10–12
3	1.50	17.850	214.20	10–12
2 x 2½	1.50	17.000	204.00	10–12
3	1.50	20.400	244.80	10–12
8	Base	54.400	652.80	10–12
10	Base	68.000	816.00	10–12
2¼ x 3	1.50	22.950	275.40	10–12
3½	2.50	26.775	321.30	10–12
2½ x 3	1.50	25.500	306.00	10–12

Warehouse Quantity Extras on Cold Finished Bars: Page 295.

Warehouse Cutting Extras: Page 299.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED STEEL

Grade—Cold Drawn, S. A. E. 1112

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
1/8	1.30	.041	.49	10–12
5/32	1.30	.065	.78	10–12
3/16	1.10	.093	1.12	10–12
7/32	1.10	.127	1.52	10–12
1/4	1.00	.166	1.99	10–12
	1.00	.166	3.32	20
9/32	1.00	.211	2.53	10–12
5/16	.90	.260	3.12	10–12
	.90	.260	5.20	20
11/32	.90	.315	3.78	10–12
3/8	.85	.375	4.50	10–12
	.85	.375	7.50	20
13/32	.85	.440	5.28	10–12
7/16	.85	.511	6.13	10–12
	.85	.511	10.22	20
15/32	.85	.586	7.03	10–12
1/2	.80	.667	8.00	10–12
	.80	.667	13.34	20
17/32	.80	.753	9.04	10–12
9/16	.80	.844	10.13	10–12
	.80	.844	16.88	20
5/8	.70	1.043	12.52	10–12
	.70	1.043	20.86	20
11/16	.60	1.262	15.14	10–12
	.60	1.262	25.24	20
3/4	.60	1.502	18.02	10–12
	.60	1.502	24.03	16
	.60	1.502	30.04	20
13/16	.55	1.762	21.14	10–12
	.55	1.762	28.19	16
	.55	1.762	35.24	20
7/8	.55	2.044	24.53	10–12
	.55	2.044	32.70	16
	.55	2.044	40.88	20
15/16	.55	2.347	28.16	10–12
	.55	2.347	37.55	16
	.55	2.347	46.94	20
1	.55	2.670	32.04	10–12
	.55	2.670	42.72	16
	.55	2.670	53.40	20

All "shafting" sizes in above list can be supplied in Shafting Quality.

Warehouse Quantity Extras on Cold Finished Bars: Page 295.

Warehouse Cutting Extras: Pages 300-302.

PRECISION FINISH
ELASTUF MEDIA
PAGES 32-33

COLD FINISHED
ELASTUF PENN
PAGES 34-35

H. R. STRIP
POTTS JJ Soft Steel Bars
Thredwel
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
APBON & ALLO
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND RESISTING STEELS
IDEX
ical Data
DGES AND EIGHTS
xtras for ize and Quantity
TTING XTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED STEEL

Grade—Cold Drawn, S. A. E. 1112

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
1 1/16	.55	3.014	36.17	10–12
	.55	3.014	48.22	16
	.55	3.014	60.28	20
1 1/8	.55	3.379	40.55	10–12
	.55	3.379	54.06	16
	.55	3.379	67.58	20
1 3/16	.55	3.765	45.18	10–12
	.55	3.765	60.24	16
	.55	3.765	75.30	20
1 1/4	.55	4.172	50.06	10–12
	.55	4.172	66.75	16
	.55	4.172	83.44	20
1 5/16	.55	4.600	55.20	10–12
	.55	4.600	73.60	16
	.55	4.600	92.00	20
1 3/8	.55	5.048	60.58	10–12
	.55	5.048	80.77	16
	.55	5.048	100.96	20
1 7/16	.55	5.518	66.22	10–12
	.55	5.518	88.29	16
	.55	5.518	110.36	20
	.55	5.518	132.43	24
1 1/2	.60	6.008	72.10	10–12
	.60	6.008	96.13	16
	.60	6.008	120.16	20
1 9/16	.60	6.519	130.38	20
1 5/8	.60	7.051	84.61	10–12
	.60	7.051	112.82	16
	.60	7.051	141.02	20
1 11/16	.60	7.604	91.25	10–12
	.60	7.604	121.66	16
	.60	7.604	152.08	20
1 3/4	.60	8.178	98.14	10–12
	.60	8.178	130.85	16
	.60	8.178	163.56	20
1 13/16	.60	8.772	140.35	16
	.60	8.772	175.44	20
1 7/8	.60	9.388	112.66	10–12
	.60	9.388	187.76	20
1 15/16	.60	10.02	120.24	10–12
	.60	10.02	160.32	16
	.60	10.02	200.40	20
	.60	10.02	240.48	24
2	.60	10.68	128.16	10–12
	.60	10.68	170.88	16
	.60	10.68	213.60	20
2 1/16	.65	11.35	227.00	20
2 1/8	.65	12.05	241.00	20
2 3/16	.65	12.77	204.32	16
	.65	12.77	255.40	20
2 1/4	.65	13.51	216.16	16
	.65	13.51	270.20	20
2 5/16	.65	14.28	285.60	20
2 3/8	.65	15.06	301.20	20
2 7/16	.65	15.86	253.76	16

All "shafting" sizes in above list can be supplied in Shafting Quality.

PRECISION FINISH ELASTUF MEDIA: PAGES 32-33

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED STEEL

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
Grade—Cold Drawn, S. A. E. 1112				
2 7/16	.65	15.86	317.20	20
	.65	15.86	380.64	24
2 1/2	.65	16.68	333.60	20
2 9/16	.80	17.53	350.60	20
2 5/8	.80	18.40	368.00	20
2 11/16	.80	19.28	385.60	20
2 3/4	.80	20.19	403.80	20
2 7/8	.80	22.07	441.40	20
Grade—Turned and Polished, S. A. E. 1112 and S. A. E. X1020				
2 15/16	.80	23.04	368.64	16
	.80	23.04	460.80	20
	.80	23.04	552.96	24
3	.80	24.03	384.48	16
	.80	24.03	480.60	20
3 1/8	.90	26.08	521.60	20
3 3/16	.90	27.13	542.60	20
3 1/4	.90	28.20	564.00	20
3 3/8	.90	30.42	608.40	20
3 7/16	1.00	31.55	631.00	20
3 1/2	1.00	32.71	654.20	20
3 3/4	1.00	37.56	751.20	20
3 15/16	1.15	41.40	828.00	20
4	1.15	42.72	854.40	20
4 1/4	1.25	48.23	964.60	20
4 7/16	1.25	52.58	1051.60	20
4 1/2	1.35	54.07	1081.40	20
4 15/16	1.45	65.10	1302.00	20
5	1.45	66.76	1335.20	20
5 1/4	1.45	73.60	1472.00	20
5 7/16	1.95	78.95	1579.00	20
5 1/2	1.95	80.78	1615.60	20
5 15/16	2.40	94.14	1882.80	20
6	2.40	96.13	1922.60	20
6 1/4	2.40	104.31	1251.72	10–12
6 1/2	3.25	112.80	1353.60	10–12
7	4.25	130.90	1570.80	10–12
7 1/2	5.50	150.21	1802.52	10–12
8	5.50	171.00	2052.00	10–12

All "shafting" sizes in above list can be supplied in Shafting Quality.

Warehouse Quantity Extras on Cold Finished Bars: Page 295.

Warehouse Cutting Extras: Pages 300-302.

PRECISION FINISH
ELASTUF MEDIA
PAGES 32-33

COLD FINISHED
ELASTUF PENN
PAGES 34-35

H. R. STRIP
POTTS JJ
Soft Steel Bars
Threadwel
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALL
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND
T RESISTIN
STEELS
IDEX
ical Data
UGES AND
VEIGHTS
xtras for
ize and
Quantity
UTTING
TRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED STEEL

HEXAGONS

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
Grade—Cold Drawn, S. A. E. 1112				
1/4	2.50	.184	2.21	10–12
5/16	2.50	.287	3.44	10–12
3/8	1.75	.414	4.97	10–12
7/16	1.25	.563	6.76	10–12
1/2	.90	.736	8.83	10–12
9/16	.80	.931	11.17	10–12
5/8	.70	1.150	13.80	10–12
11/16	.60	1.391	16.69	10–12
3/4	.60	1.656	19.87	10–12
13/16	.60	1.943	23.32	10–12
7/8	.55	2.25	27.00	10–12
15/16	.55	2.587	31.04	10–12
1	.50	2.944	35.33	10–12
1 1/16	.50	3.324	39.89	10–12
1 1/8	.45	3.727	44.72	10–12
1 3/16	.45	4.152	49.82	10–12
1 1/4	.45	4.601	55.21	10–12
1 3/8	.50	5.567	66.80	10–12
1 7/16	.50	6.085	73.02	10–12
1 1/2	.60	6.625	79.50	10–12
1 5/8	.60	7.775	93.30	10–12
1 3/4	.60	9.018	108.22	10–12
1 7/8	.60	10.352	124.22	10–12
2	.75	11.778	141.34	10–12
Grade—Cold Drawn, S. A. E. 1120				
2 1/4	1.00	14.907	178.88	10–12
2 3/8	1.00	16.609	199.31	10–12
2 1/2	1.00	18.403	220.84	10–12
2 3/4	1.00	22.266	267.19	10–12
3	1.50	26.500	318.00	10–12

Warehouse Quantity Extras on Cold Finished Bars: Page 295.

Warehouse Extras For Selected Cold Finished Steels From Stock

Extra for Special Finish and Accuracy—
Double the Net Extra for Size.

Extra for Accuracy
When selecting rounds, squares, flats and hexagons from Warehouse stock, to accuracy limits closer than manufacturers' standard tolerance, double the charges shown in Manufacturers' Standard Classification of Extras.

PRECISION FINISH
ELASTUF MEDIA
PAGES 32-33

COLD FINISHED
ELASTUF PENN
PAGES 34-35

COLD FINISHED STEEL

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
Grade—Cold Drawn, S. A. E. 1112				
1/8	5.00	.053	.64	10–12
3/16	4.00	.119	1.43	10–12
1/4	2.50	.212	2.54	10–12
5/16	2.50	.322	3.86	10–12
3/8	1.75	.478	5.74	10–12
7/16	1.75	.650	7.80	10–12
1/2	1.30	.850	10.20	10–12
9/16	1.30	1.075	12.90	10–12
5/8	1.30	1.328	15.94	10–12
11/16	1.05	1.607	19.28	10–12
3/4	1.05	1.912	22.94	10–12
13/16	1.05	2.244	26.93	10–12
7/8	1.05	2.603	31.24	10–12
15/16	1.05	2.988	35.86	10–12
1	1.05	3.400	40.80	10–12
1 1/8	1.05	4.303	51.64	10–12
1 1/4	1.05	5.313	63.76	10–12
Grade—Cold Drawn, S. A. E. 1120				
1 3/8	1.25	6.428	77.14	10–12
1 1/2	1.25	7.650	91.80	10–12
1 5/8	1.25	8.978	107.74	10–12
1 3/4	1.25	10.413	124.96	10–12
2	1.25	13.600	163.20	10–12
2 1/4	2.00	17.216	206.59	10–12
2 1/2	2.00	21.250	255.00	10–12
3	2.00	30.600	367.20	10–12
3 1/4	2.00	35.91	430.92	10–12
3 1/2	2.00	41.65	499.80	10–12
4	2.00	54.40	652.80	10–12

We can furnish either from stock or promptly from mill, every class of cold finished bar steel:

COLD DRAWN

TURNED AND POLISHED

TURNED, GROUND AND POLISHED

in the following grades:

ALL CLASSES AND ANALYSES OF STRAIGHT CARBON STEEL

ALL S. A. E. ANALYSES ALLOY STEELS

STAINLESS STEEL

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ
Soft Steel
Bars
Threadwel
EXPANDED &
PERFORATED
METALS
GRATING
STAIR TREADS
STEEL
PLATES
USS COR-TEN
USS MAN-TEN
STEEL
SHEETS
ARMCO
Ingot Iron
ROOFING
SIDING
WELDING
WIRES
Accessories
BRASS
COPPER
BOILER
TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALL
STEELS
TOOL
STEELS
DRILL RODS
STAINLESS
AND
T RESISTIN
STEELS
INDEX
nical Data
GAUGES AND
WEIGHTS
Extras for
Size and
Quantity
CUTTING
EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

PRECISION FINISH
ELASTUF MEDIA
MACHINERY STEEL

Analysis

.35/.45 Carbon Open Hearth S. A. E. 1040 Steel.

Quality

Precision Finish ELASTUF MEDIA, to insure freedom from mechanical defects, is manufactured from specially selected billets, and is also made under grain size control, which results in excellent uniformity and improved machinability. This grade is carried in stock for purposes requiring greater strength and accuracy than ordinary cold finished steel.

Sizes

½″ to 1⅛″ Rds., Incl.—Produced by Grinding and Polishing Cold Drawn Bars.
$1\frac{3}{16}$″ to 4″ Rds., Incl.—Produced by Turning, Grinding and Polishing Hot Rolled Bars.

Accuracy and Finish

Guaranteed as follows:

Up to $2\frac{7}{16}$″ Incl.	2½″ and Larger.
Plus .000, Minus .002″	Plus .000, Minus .003″

The finish is bright and mirror-like, and bars are straight and true round.

Physical Properties

Tests taken from 1½″ to 2″ Round:

Tensile Strength	70/90,000 lbs. per sq. in.
Yield Point	35/50,000 lbs. per sq. in.
Elongation in 2″	20/30%
Reduction of Area	35/50%
Brinell	160/200

All physical properties shown are average, and cannot be guaranteed. Finishing temperatures, permissible variation in analysis and size, each may cause a change in physicals.

Machinability

Because of the high carbon and the excellent balance of its other constituents, Precision Finish ELASTUF MEDIA machines readily, there being a complete absence of tear and drag. Sizes $1\frac{3}{16}$″ and larger do not have the tendency to warp as do the Cold Drawn steels.

"ELASTUF"—A Standard of Quality in Carbon and Alloy Machinery Steels: Page 123.

HOT ROLLED ELASTUF MEDIA MACHINERY STEEL: Page 124

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

PRECISION FINISH
ELASTUF MEDIA
MACHINERY STEEL
ROUNDS

S. A. E. 1040

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Stock Lengths Feet
1/2	.80	.667	13.34	20
5/8	.70	1.043	20.86	20
3/4	.60	1.502	30.04	20
7/8	.55	2.044	40.88	20
1	.55	2.670	53.40	20
1 1/8	.55	3.379	67.58	20
1 3/16	.55	3.765	75.30	20
1 1/4	.55	4.172	83.44	20
1 5/16	.55	4.600	92.00	20
1 3/8	.55	5.048	100.96	20
1 7/16	.55	5.518	110.36	20
1 1/2	.60	6.008	120.16	20
1 9/16	.60	6.519	130.38	20
1 5/8	.60	7.051	141.02	20
1 11/16	.60	7.604	152.08	20
1 3/4	.60	8.178	163.56	20
1 13/16	.60	8.772	175.44	20
1 7/8	.60	9.388	187.76	20
1 15/16	.60	10.02	200.40	20
2	.60	10.68	213.60	20
2 1/16	.65	11.35	227.00	20
2 1/8	.65	12.05	241.00	20
2 3/16	.65	12.77	255.40	20
2 1/4	.65	13.51	270.20	20
2 3/8	.65	15.06	301.20	20
2 7/16	.65	15.86	317.20	20
2 1/2	.65	16.68	333.60	20
2 11/16	.80	19.28	385.60	20
2 3/4	.80	20.19	403.80	20
2 7/8	.80	22.07	441.40	20
2 15/16	.80	23.04	460.80	20
3	.80	24.03	480.60	20
3 7/16	1.00	31.55	631.00	20
3 1/2	1.00	32.71	654.20	20
3 15/16	1.15	41.40	828.00	20
4	1.15	42.72	854.40	20

Sizes not carried in stock can be quickly secured.

Extras for Quantity Standard Cold Finished: Page 295.

Cutting Extras: Pages 300-302.

Boxing and Handling:—The utmost care is necessary in handling these steels, if the high surface finish is to be maintained. We use leather and burlap-covered racks, crane chains and trestles. On deliveries by our truck, material is handled in boxes, which we take back, and for which we make no charge. Freight shipments must be boxed. We assume no responsibility for arrival in good condition unless properly boxed. Boxing is charged for at cost.

A. R. STRIP
POTTS JJ Soft Steel Bars
Thredwel
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
STEELS
TOOL STEELS
DRILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
nical Data
UGES AND
WEIGHTS
Extras for Size and Quantity
UTTING
TRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED
ELASTUF PENN
MACHINERY STEEL

We list some of the many advantages offered by the use of this finish:

1. It will fit collets in your automatics, and machine beautifully, being manufactured under Grain Size Control.
2. It possesses a desirable combination of physical properties, the tensile strength and yield point being considerably higher than **Hot Rolled ELASTUF PENN:** Pages 125-129. This improvement is especially noticeable with the yield point.
3. It can be used instead of un-heat-treated or annealed Cold Finished Alloy Steels as its physicals are equal to and in many cases superior to such steels, its machining qualities much better, and its cost appreciably lower.
4. It does away with the necessity of carrying a stock of several grades of steel as it is a fine "general purpose" steel, combining the advantages of cold finish size accuracy, excellent physical properties and good machining and heat treating qualities.
5. We recommend its use where such Cold Finished steels have been used as

S. A. E. 1020–1120–1112
1035–1040–1045
3130–3135–3140 } Annealed
2330–2335–2340 }

Consult page 127 for list of applications where **Hot Rolled ELASTUF PENN**, pages 125-129, is used, and in general the same list may be taken as a guide. It should be noted that in common with all cold drawn steels, Cold Finished ELASTUF PENN has considerable increased strength figures over the hot rolled, but some reduction in ductility.

"ELASTUF"—A Standard of Quality in Carbon and Alloy Machinery Steels: Page 123.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLD FINISHED
ELASTUF PENN
MACHINERY STEEL

ROUNDS

Size Inches	Net Extra For Size	Estimated Weight Per Foot	Estimated Weight Per Bar	Length of Bars Feet
1/2	.80	.667	13.34	20
5/8	.70	1.043	20.86	20
3/4	.60	1.502	30.04	20
7/8	.55	2.044	40.88	20
1	.55	2.67	53.40	20
1 1/16	.55	3.014	60.28	20
1 1/8	.55	3.379	67.58	20
1 3/16	.55	3.765	75.30	20
1 1/4	.55	4.172	83.44	20
1 5/16	.55	4.600	92.00	20
1 3/8	.55	5.048	100.96	20
1 7/16	.55	5.518	110.36	20
1 1/2	.60	6.008	120.16	20
1 9/16	.60	6.519	130.38	20
1 5/8	.60	7.051	141.02	20
1 3/4	.60	8.178	163.56	20
1 7/8	.60	9.388	187.76	20
1 15/16	.60	10.02	200.40	20
2	.60	10.68	213.60	20
2 1/8	.65	12.05	241.00	20
2 3/16	.65	12.77	255.40	20
2 1/4	.65	13.51	270.20	20
2 7/16	.65	15.86	317.20	20
2 1/2	.65	16.68	333.60	20
2 11/16	.80	19.28	385.60	20
2 3/4	.80	20.19	403.80	20
2 7/8	.80	22.07	441.40	20
2 15/16	.80	23.04	460.80	20
3	.80	24.03	480.60	20

Extras for Quantity Standard Cold Finished: Page 295.
Cutting Extras: Pages 300-302.

Approximate Physical Properties of Cold Finished ELASTUF PENN Compared with Cold Drawn Alloy Steels and Cold Drawn S.A.E. 1045

	Tensile Strength Lbs. Per Sq. In.	Yield Point Lbs. Per Sq. In.	Elongation in 2 Inches Per Cent	Reduction of Area Per Cent	Brinell
Cold Drawn ELASTUF PENN up to 1½" Rd.	100/120,000	95/110,000	15/25	35/50	197/223
Cold Drawn S.A.E. 3135-40 Annealed	95/125,000	85/110,000	12/22	35/50	201/262
Cold Drawn S.A.E. 2335-40 Annealed	100/125,000	90/110,000	10/22	40/50	197/262
Cold Drawn S.A.E. 1045	90/115,000	80/100,000	5/15	30/45	183/228

All figures taken from manufacturers' published data.

Heat Treatment: Oil Quench and Draw. Consult us.

Hot Rolled ELASTUF PENN: Pages 125-129.

H. R. STRIP
POTTS JJ Soft Steel Bars
Thredwel
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND RESISTING STEELS
DEX
ical Data
UGES AND
EIGHTS
xtras for
ize and
eavity
TTING
XTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

HOT ROLLED STRIP STEEL

HOOPS AND BANDS

BLACK

B. W. Gauge and Size in Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
#22 x ½	.0476	3.25	Coils
⅝	.0595	2.35	Coils
¾	.0714	1.85	Coils
1	.0952	1.45	Coils
#20 x ¾	.0893	1.35	Coils
1	.1190	.95	Coils
1¼	.1488	.95	Coils
1½	.1785	.90	Coils
#18 x 1	.1666	.75	Coils
1¼	.2083	.75	Coils
1½	.2499	.60	Coils
1¾	.2916	.60	Coils
#16 x ⅜	.0829	2.40	12
½	.1105	1.55	12
⅝	.1381	1.05	12
¾	.1658	.90	12
⅞	.1934	.80	12
1	.2210	.65	12
1¼	.2763	.65	12
1½	.3315	.50	12
1¾	.3868	.50	12
2	.4420	.50	12
2½	.5525	.45	12
3	.6630	.45	12
#14 x ½	.1411	1.35	12
⅝	.1764	.95	12
¾	.2117	.85	12
⅞	.2469	.70	12
1	.2822	.60	12
1¼	.3528	.60	12
1½	.4233	.45	12
1¾	.4939	.45	12
2	.5644	.45	12
2½	.7055	.40	12
3	.8466	.35	12
⅛ x ⅜	.16	1.60	12
½	.21	1.10	12
⅝	.27	.75	12
¾	.32	.60	12
⅞	.38	.50	12
1	.43	.40	12 and 20
1⅛	.48	.40	12 and 20
1¼	.53	.40	12 and 20
1⅜	.58	.40	20
1½	.64	.35	12 and 20
1¾	.75	.35	12 and 20
2	.85	.35	12 and 20
2¼	.96	.30	20
2½	1.06	.30	12 and 20
2¾	1.17	.25	20
3	1.28	.25	12 and 20

HOT ROLLED STRIP STEEL

BANDS

BLACK

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
1/8 x 3 1/2	1.49	.20	20
4	1.70	.20	20
4 1/2	1.92	.15	20
5	2.13	.15	20
6	2.55	.15	20
7	2.98	.10	20
8	3.40	.10	20
10	4.26	.10	20
12	5.10	.10	20
14	5.95	.10	12
16	6.80	.10	12
18	7.65	.10	12
20	8.50	.10	12
22	9.35	.05	12
3/16 x 3/8	.24	1.45	12
1/2	.32	1.05	12
5/8	.40	.70	12
3/4	.48	.55	12
7/8	.56	.45	12
1	.64	.35	12 and 20
1 1/8	.72	.35	12 and 20
1 1/4	.80	.35	12 and 20
1 3/8	.88	.35	20
1 1/2	.96	.30	12 and 20
1 3/4	1.11	.30	12 and 20
2	1.28	.30	12 and 20
2 1/4	1.44	.25	20
2 1/2	1.59	.25	12 and 20
2 3/4	1.75	.20	20
3	1.91	.20	12 and 20
3 1/2	2.23	.15	20
4	2.55	.15	20
4 1/2	2.87	.10	20
5	3.19	.10	20
6	3.83	.10	20
7	4.46	.05	20
8	5.10	.05	20
9	5.74	.05	20
10	6.38	.05	20
12	7.65	.05	20

All standard sizes Galvanized Hoops can be furnished promptly. Prices on application.

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

Page No.
Bands 36
Hoops 37
H. R. STRIP
POTTS JJ
Soft Steel
Bars
Thredwel
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO
Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
STEELS
TOOL STEELS
DRILL RODS
TAINLESS AND
T RESISTING
STEELS
IDEX
ical Data
UGES AND
EIGHTS
xtras for
ize and
uantity
UTTING
XTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH

Quality:

Guaranteed Analysis.
Manufactured under Grain Size Control.
Rolled from Specially Selected Billets.
Free from Mechanical Defects.

For jobs requiring—
Forging—Welding—Machining
Hot or Cold Bending
Carburizing—Heat Treating

Analysis:

Uniform and definite analysis for all sizes:

Carbon	.15/.25
Manganese	.30/.60
Phosphorus	.045 Max.
Sulphur	.05 Max.

(Conforms to S. A. E. 1020)

Physical Qualities—Average of 1½" Rd. Untreated

Tensile Strength	55/65,000 lbs. per sq. in.
Yield Point	30/40,000 lbs. per sq. in.
Elongation in 2"	25/35%
Reduction of Area	45/55%
Brinell	130/190

(All physical properties shown are average, and cannot be guaranteed. Finishing temperatures, permissible variation in analysis, and size, each may cause a change in physicals.)

Forging:

Quality: POTTS JJ is a splendid forging steel, permitting the forging of most difficult shapes and allowing of being drawn down to small dimensions without splitting. In these respects it resembles a high grade wrought iron like Swedish iron.

Forging Heat: Ample time must be allowed for a thorough, soaking heat. At a bright orange or lemon heat (1700°) it will work easily, flow well and not open surface seams. It can be worked down on one heat to small sizes.

Welding:

Analysis: Proper and uniform analysis as well as definite knowledge of the steel are essential if the welder is to secure satisfactory results. You can be assured that all sizes of POTTS JJ are practically of the same analysis.

Welding Heat: A white heat (2000°), not sparkling, is proper. Always protect surfaces to be welded with borax or any good welding flux. Hammer lightly until black cold.

Bending:

Because of its high ductility figures (note above elongation and reduction of area) which are due to its uniformity and well balanced analysis, POTTS JJ will stand the maximum of either hot or cold bending without fracture.

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH

Machining:

POTTS JJ steel has excellent machining qualities. Will give a fine finish with freedom from warping, and within the limitations of a low sulphur steel cuts clean and free.

Where high sulphur steel of lower strength can be used for threading jobs, we recommend **THREDWEL** shown on page 48.

Heat Treating:

Responds with certainty to various heat treatments: quenching, carburizing, and cyaniding. On request, definite methods will be recommended for particular purposes.

Carburizing:

The most important heat treatment for this class of steel is carburizing. The following are recommended, depending upon the cross-section of the piece to be hardened, and the purpose for which it will be used:

Carburize at 1650° to 1700° F.
Quench
Draw at 250° to 500° F.
} S. A. E. 1020-I*

Carburize at 1650° to 1700° F.
Cool in Box
Reheat to 1400° to 1450° F.
Quench
Draw at 250° to 500° F.
} S. A. E. 1020-IV*

Carburize at 1650° to 1750° F.
Cool in Box
Reheat to 1600° to 1650° F.
Quench
Reheat to 1400° to 1450° F.
Quench
Draw at 250° to 500° F.
} S. A. E. 1020-V*

(*) S. A. E. Standard Heat treatments.

Cyaniding:

POTTS JJ responds readily to cyanide hardening.

Page No.
Spring Steel 47
Swedish Iron 47
POTTS JJ Soft Steel Bars
Thredwel
EXPANDED & PERFORATED METALS
GRATING STAIR TREADS
STEEL PLATES
USS COR-TEN USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING SIDING
WELDING WIRES
Accessories
BRASS COPPER
BOILER TUBES
ING CHAINS
CHAIN WIRE ROPE
ELASTUF APRON & ALL STEELS
TOOL STEELS
DRILL RODS
TAINLESS AND T RESISTIN STEELS
NDEX
nical Data
UGES AND WEIGHTS
Extras for Size and Quantity
UTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH FLATS

Grade—S. A. E. 1020

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
1/4 x 3/8	.32	1.40	14–16
1/2	.43	.90	14–16
5/8	.53	.60	14–16
3/4	.64	.40	14–16
7/8	.74	.30	14–16
1	.85	.15	20–22
1 1/8	.96	.15	20–22
1 1/4	1.06	.15	20–22
1 3/8	1.17	.15	20–22
1 1/2	1.28	.15	20–22
1 3/4	1.49	.15	20–22
2	1.70	.15	20–22
2 1/4	1.91	.15	20–22
2 1/2	2.12	.15	20–22
2 3/4	2.34	.15	20–22
3	2.55	.15	20–22
3 1/4	2.76	.15	20–22
3 1/2	2.98	.15	20–22
4	3.40	.15	20–22
4 1/2	3.83	.15	20–22
5	4.25	.15	20–22
6	5.10	.15	20–22
7	5.95	Base	20–22
8	6.80	Base	20–22
10	8.50	Base	20–22
12	10.20	Base	20–22
5/16 x 1/2	.53	.90	14–16
5/8	.66	.60	14–16
3/4	.80	.40	14–16
7/8	.93	.30	14–16
1	1.06	.15	20–22
1 1/8	1.20	.15	20–22
1 1/4	1.33	.15	20–22
1 3/8	1.46	.15	20–22
1 1/2	1.59	.15	20–22
1 3/4	1.86	.15	20–22
2	2.12	.15	20–22
2 1/4	2.39	.15	20–22
2 1/2	2.65	.15	20–22
3	3.19	.15	20–22
3 1/2	3.72	.15	20–22
4	4.25	.15	20–22
5	5.31	.15	20–22
6	6.38	.15	20–22

Warehouse Quantity Extras and Deductions: Page 295.
Warehouse Cutting Extras: Pages 303-304.

It's true economy to buy your steel from warehouse. You get just what you want—no more—no less.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH

FLATS

Grade—S. A. E. 1020

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
⅜ x ½	.64	.70	14–16
⅝	.80	.40	14–16
¾	.96	.30	14–16
⅞	1.12	.20	14–16
1	1.28	Base	20–22
1⅛	1.44	Base	20–22
1¼	1.59	Base	20–22
1⅜	1.75	Base	20–22
1½	1.92	Base	20–22
1¾	2.23	Base	20–22
2	2.55	Base	20–22
2¼	2.87	Base	20–22
2½	3.19	Base	20–22
2¾	3.51	Base	20–22
3	3.83	Base	20–22
3¼	4.15	Base	20–22
3½	4.47	Base	20–22
4	5.10	Base	20–22
4½	5.74	Base	20–22
5	6.38	Base	20–22
6	7.65	Base	20–22
7	8.93	Base	20–22
8	10.20	Base	20–22
10	12.75	Base	20–22
12	15.30	Base	20–22
½ x ⅝	1.06	.40	14–16
¾	1.28	.30	14–16
⅞	1.49	.20	14–16
1	1.70	Base	20–22
1⅛	1.92	Base	20–22
1¼	2.12	Base	20–22
1½	2.55	Base	20–22
1¾	2.98	Base	20–22
2	3.40	Base	20–22
2¼	3.83	Base	20–22
2½	4.25	Base	20–22
2¾	4.68	Base	20–22
3	5.10	Base	20–22
3¼	5.53	Base	20–22
3½	5.95	Base	20–22
4	6.80	Base	20–22
4½	7.65	Base	20–22
5	8.50	Base	20–22
6	10.20	Base	20–22
7	11.90	Base	20–22
8	13.60	Base	20–22
9	15.30	Base	20–22
10	17.00	Base	20–22
12	20.40	Base	20–22

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH FLATS

Grade—S. A. E. 1020

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
5/8 x 1	2.13	Base	20–22
1 1/8	2.39	Base	20–22
1 1/4	2.65	Base	20–22
1 1/2	3.19	Base	20–22
1 3/4	3.72	Base	20–22
2	4.25	Base	20–22
2 1/4	4.78	Base	20–22
2 1/2	5.31	Base	20–22
2 3/4	5.84	Base	20–22
3	6.38	Base	20–22
3 1/4	6.91	Base	20–22
3 1/2	7.44	Base	20–22
4	8.50	Base	20–22
4 1/2	9.47	Base	20–22
5	10.63	Base	20–22
6	12.75	Base	20–22
7	14.87	Base	20–22
8	17.00	Base	20–22
10	21.25	Base	20–22
12	25.50	Base	20–22
3/4 x 1	2.55	Base	20–22
1 1/4	3.19	Base	20–22
1 1/2	3.83	Base	20–22
1 3/4	4.47	Base	20–22
2	5.11	Base	20–22
2 1/4	5.75	Base	20–22
2 1/2	6.38	Base	20–22
2 3/4	7.02	Base	20–22
3	7.65	Base	20–22
3 1/4	8.29	Base	20–22
3 1/2	8.93	Base	20–22
4	10.20	Base	20–22
4 1/2	11.48	Base	20–22
5	12.75	Base	20–22
6	15.30	Base	20–22
7	17.85	Base	20–22
8	20.40	Base	20–22
10	25.50	Base	20–22
12	30.60	Base	20–22
7/8 x 1	2.98	Base	20–22
1 1/4	3.72	Base	20–22
1 1/2	4.47	Base	20–22
1 3/4	5.20	Base	20–22
2	5.95	Base	20–22

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

Always uniform—specify Potts JJ. It machines well, forges satisfactorily, and bends either hot or cold.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH

FLATS

Grade—S. A. E. 1020

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
⅞ x 2¼	6.69	Base	20–22
2½	7.44	Base	20–22
3	8.93	Base	20–22
3½	10.41	Base	20–22
4	11.90	Base	20–22
4½	13.39	Base	20–22
5	14.87	Base	20–22
6	17.85	Base	20–22
1 x 1¼	4.25	Base	20–22
1½	5.10	Base	20–22
1¾	5.95	Base	20–22
2	6.80	Base	20–22
2¼	7.65	Base	20–22
2½	8.50	Base	20–22
3	10.20	Base	20–22
3½	11.90	Base	20–22
4	13.60	Base	20–22
4½	15.30	Base	20–22
5	17.00	Base	20–22
6	20.40	Base	20–22
7	23.80	Base	20–22
8	27.20	Base	20–22
10	34.00	Base	20–22
12	40.80	Base	20–22
1¼ x 1½	6.37	.10	20–22
2	8.50	.10	20–22
2¼	9.57	.10	20–22
2½	10.62	.10	20–22
3	12.75	.10	20–22
3½	14.88	.15	20–22
4	17.00	.20	20–22
4½	19.13	.20	20–22
5	21.25	.20	20–22
6	25.50	.20	20–22
7	29.75	Base	20–22
8	34.00	Base	20–22
1½ x 2	10.20	.10	20–22
2¼	11.48	.10	20–22
2½	12.75	.10	20–22
3	15.30	.10	20–22
3½	17.85	.15	20–22
4	20.40	.20	20–22
4½	22.95	.20	20–22
5	25.50	.20	20–22
6	30.60	.20	20–22
7	35.70	Base	20–22
8	40.80	Base	20–22

Warehouse Quantity Extras and Deductions: Page 295.
Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH

FLATS

Grade—S. A. E. 1020

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
1¾ x 2½	14.88	.10	20–22
3	17.85	.10	20–22
3½	20.83	.15	20–22
4	23.80	.20	20–22
5	29.75	.20	20–22
6	35.70	.20	20–22
2 x 2½	17.00	.10	20–22
3	20.40	.10	20–22
3½	23.80	.15	20–22
4	27.20	.20	20–22
4½	30.60	.20	20–22
5	34.00	.20	20–22
6	40.80	.20	20–22
7	47.60	Base	20–22
8	54.40	Base	20–22
2½ x 3	25.50	.25	20–22
3½	29.75	.25	20–22
4	34.00	.25	20–22
5	42.50	.25	20–22
6	51.00	.30	20–22
3 x 4	40.80	.25	20–22
5	51.00	.25	20–22
6	61.20	.30	20–22

Sizes not shown can be promptly supplied.

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Page 299.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH

ROUNDS

Grade—S. A. E. 1020

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
*3/16	.094	2.00	12
1/4	.167	1.00	16
5/16	.261	.70	16
3/8	.375	.40	20
7/16	.511	.30	20
1/2	.667	.20	20
9/16	.845	.15	20
5/8	1.04	.10	20–22
11/16	1.26	.10	20–22
3/4	1.50	Base	20–22
13/16	1.76	Base	20–22
7/8	2.05	Base	20–22
15/16	2.35	Base	20–22
1	2.67	Base	20–22
1 1/16	3.01	Base	20–22
1 1/8	3.38	Base	20–22
1 3/16	3.77	Base	20–22
1 1/4	4.17	Base	20–22
1 3/8	5.05	Base	20–22
1 7/16	5.52	Base	20–22
1 1/2	6.01	Base	20–22
1 5/8	7.05	.10	20–22
1 3/4	8.18	.10	20–22
1 7/8	9.39	.10	20–22
2	10.68	.10	20–22
2 1/8	12.06	.15	20–22
2 1/4	13.52	.15	20–22
2 3/8	15.07	.15	20–22
2 1/2	16.69	.15	20–22
2 5/8	18.40	.20	20–22
2 3/4	20.20	.20	20–22
2 7/8	22.07	.20	20–22
3	24.02	.20	20–22
3 1/8	26.08	.25	20–22
3 1/4	28.20	.25	20–22
3 3/8	30.42	.25	20–22
3 1/2	32.71	.25	20–22
3 5/8	35.09	.25	20–22
3 3/4	37.56	.25	20–22
4	42.73	.25	20–22
4 1/4	48.24	.25	20–22
4 1/2	54.07	.25	20–22
4 3/4	60.25	.35	20–22
5	66.76	.35	20–22
5 1/4	73.60	.45	20–22
5 1/2	80.77	.45	20–22
5 3/4	88.29	.55	20–22

*Low Carbon Soft Drawn Wire, straightened and cut.

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 300-304.

EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLO
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
nical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
UTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS JJ—SOFT STEEL

GUARANTEED DOMESTIC OPEN HEARTH ROUNDS

Grade—S. A. E. 1020

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
6	96.14	.55	20–22
6¼	104.31	.65	20–22
6½	112.80	.65	20–22
7	130.90	.75	20–22
7½	150.21	.75	20–22
8	171.00	1.10	20–22
*10	267.00	3.40	14–16

*Hammered, Normalized and Rough Turned.

SQUARES

¼	.212	1.00	16
5/16	.332	.70	16
⅜	.478	.40	16
7/16	.651	.30	16
½	.850	.20	16
9/16	1.08	.15	16
⅝	1.33	.10	20–22
¾	1.91	Base	20–22
⅞	2.61	Base	20–22
1	3.40	Base	20–22
1⅛	4.31	Base	20–22
1¼	5.31	Base	20–22
1⅜	6.43	Base	20–22
1½	7.65	Base	20–22
1⅝	8.98	.10	20–22
1¾	10.41	.10	20–22
2	13.60	.10	20–22
2¼	17.22	.15	20–22
2½	21.25	.15	20–22
2¾	25.71	.20	20–22
3	30.60	.20	20–22
3¼	35.91	.25	20–22
3½	41.65	.25	20–22
4	54.40	.25	20–22
4½	68.85	.25	20–22
5	85.00	.35	20–22

SOFT STEEL

HALF OVALS

Use "BAR STEEL" Base Price

½ x ⅛	.149	1.20	16
⅝ x 3/16	.284	.90	16
¾ x 3/16	.334	.70	16
⅞ x ¼	.527	.70	16
1 x ¼	.594	.40	20–22
1¼ x 5/16	.928	.40	20–22
1¼ x ⅜	1.136	.40	20–22
1½ x ⅜	1.337	.40	20–22
1½ x ½	1.843	.40	20–22
2 x ⅜	1.747	.40	20–22
2 x ½	2.376	.40	20–22
2½ x ⅝	3.713	.40	20–22

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

SOFT STEEL

HALF ROUNDS

Use "BAR STEEL" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
3/8	.187	1.50	16
1/2	.334	1.00	20–22
5/8	.522	.70	20–22
3/4	.750	.50	20–22
7/8	1.02	.50	20–22
1	1.34	.30	20–22
1 1/4	2.09	.30	20–22
1 1/2	3.00	.30	20–22
1 3/4	4.09	.30	20–22
2	5.34	.30	20–22
2 1/2	8.35	.30	20–22
3	12.02	.30	20–22

SILICO MANGANESE SPRING STEEL

S. A. E. 9250—Round Edge—Measured Overall

An especially elastic and tough alloy spring steel, stronger and tougher than Carbon Spring Steel.

Heat Treatment: Oil quench from 1550° to 1650° F., draw to desired hardness.

1/4 x 1 1/2	1.20	Base	20–22
1 3/4	1.44	Base	20–22
2	1.66	Base	20–22
2 1/4	1.80	Base	20–22
5/16 x 1 1/2	1.40	Base	20–22
1 3/4	1.80	Base	20–22
2	2.00	Base	20–22
2 1/4	2.25	Base	20–22
2 1/2	2.50	Base	20–22
3	3.03	Base	20–22
3/8 x 2 1/2	3.06	Base	20–22
3	3.58	Base	20–22
3 1/2	4.23	Base	20–22

SWEDISH IRON

(Norway Iron)

ROUNDS

For chains, clevises, mine car draw-bars, chain hooks. (Forged at bright yellow heat, 1900° F.)

1/4	.167	.90	12
5/16	.261	.70	12
3/8	.368	.50	12
7/16	.501	.40	12
1/2	.654	.30	12
5/8	1.02	.20	12
3/4	1.47	.10	14–16
7/8	2.01	.10	14–16
1	2.62	Base	14–16
1 1/8	3.32	Base	14–16
1 1/4	4.09	Base	14–16
1 3/8	4.95	Base	14–16
1 1/2	5.89	Base	14–16
1 5/8	6.93	Base	14–16
1 3/4	8.02	Base	14–16
2	10.47	.20	14–16
2 1/2	16.36	.40	14–16

EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLO
STEELS
TOOL STEELS
DRILL RODS
STAINLESS AND
T RESISTING STEELS
NDEX
hnical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

THREDWEL

HOT ROLLED SCREW STEEL

Recommended for bolts, nuts, and other parts requiring special threading qualities. For parts requiring great strength or resistance to shock or vibration, use ELASTUF TYPE A, HEAT TREATED: Pages 138-142.

ROUNDS

Use "BAR STEEL" Base Price

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
Grade—S. A. E. 1112			
3/8	.375	.40	16
7/16	.511	.30	16
1/2	.667	.20	16
5/8	1.04	.10	16
3/4	1.50	Base	20–22
7/8	2.04	Base	20–22
1	2.67	Base	20–22
1 1/8	3.38	Base	20–22
1 1/4	4.17	Base	20–22

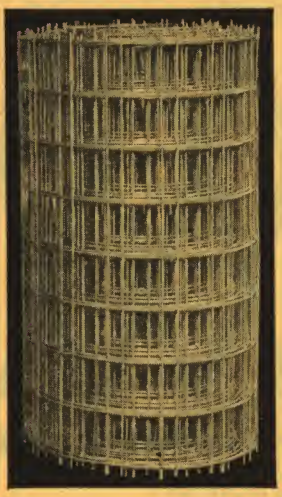
HEXAGONS

Use "BAR STEEL" Base Price

Grade—S. A. E. 1112			
11/16	1.40	.20	20–22
3/4	1.66	.125	20–22
7/8	2.25	.125	20–22
1	2.94	.125	20–22
1 1/16	3.33	.125	20–22
1 1/8	3.73	.125	20–22
Grade—S. A. E. 1120			
1 1/4	4.60	.125	20–22
1 3/8	5.57	.125	20–22
1 7/16	6.08	.125	20–22
1 1/2	6.64	.125	20–22
1 5/8	7.78	.25	20–22
1 3/4	9.02	.25	20–22
1 13/16	9.67	.25	20–22
1 7/8	10.32	.25	20–22
2	11.78	.25	20–22
2 3/16	14.10	.25	20–22
2 1/4	14.91	.25	20–22
2 3/8	16.61	.25	20–22
2 1/2	18.40	.25	20–22
2 3/4	22.27	.25	20–22

Warehouse Quantity Extras and Deductions: Page 295.
Warehouse Cutting Extras: Pages 301-304.

WELDED WIRE REINFORCING FABRIC



Arch or Slab Reinforcement

Standard Stock sizes marked *. Other sizes shown are usually available for immediate delivery, and sizes not listed below can be made up promptly.

Size of Mesh	Gauge of Wire	Weight in Pounds per 100 Sq. Ft.	Stock Size of Rolls
3 x 16	# 8/12	32	
4 x 12	#12/12*	13	
4 x 12	#10/12	19	
4 x 12	#9/12	22	
4 x 12	#8/12	26	4′ x 200′
4 x 12	#4/8*	51	4′ x 150′
			5′ x 150′
4 x 16	#7/11*	30	
4 x 16	#6/10	35	
4 x 16	#5/10*	40	
4 x 16	#4/9	48	
4 x 16	#3/8	56	
Reinforcement Two Ways			
4 x 4	#14/14*	11	
4 x 4	#13/13	14	
4 x 4	#8/8	44	
6 x 6	#12/12	13	
6 x 6	#10/10*	21	4′ x 200′
6 x 6	#9/9	25	4′ x 150′
6 x 6	#8/8*	30	5′ x 150′
6 x 6	#6/6*	42	
6 x 6	#5/5	49	
6 x 12	#0/6*	65	
BEAM WRAPPER			
2 x 4	#13/14*	19	
			4′ x 200′
2 x 2	#14/14*	21	4′ x 150′
2 x 2	#12/12	37	5′ x 150′
2 x 2	#10/10	60	

Manufactured to A. S. T. M. Specifications.

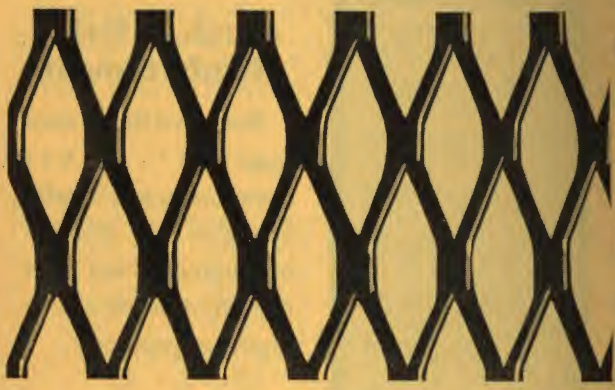
Sold only in stock size rolls—we do not cut these rolls.

Page No.
Expanded Metal 50-52
Shelf-X Flat Mesh 50-52
Perforated Metals 53
EXPANDED & PERFORATED METALS
GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLO
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND
T RESISTING
STEELS
NDEX
hnical Data
AUGES AND
WEIGHTS
Extras for Size and Quantity
UTTING
EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

RED TOP ECONO MESH PRODUCTS



CROSS-SECTION OF
RED TOP EXPANDED METAL.

CROSS-SECTION OF
SHELF-X FLAT MESH STEEL.

Red Top Econo Mesh is a continuous steel fabric of uniformly shaped diamond meshes cut and expanded from sheets of open hearth steel. It is made in a variety of mesh sizes. Red Top Econo Meshes are free from mechanical joints and the strands are made clean and smooth by a special deburring process. The sheets can be cut in any direction without the strands unravelling. The diamond mesh pattern adds attractiveness to items of which it becomes a part. The meshes are easy to clean and do not obstruct light and air. Aside from contributing towards a superior product, Red Top Econo Mesh makes possible economies in design and fabrication.

SOME SUGGESTED USES FOR RED TOP ECONO MESH

Household Appliances
Radiator Guards for Autos and Trucks
Ventilating Fan Guards
Railway Signal Guards
Reinforcing Moulded Mineral Products
Truck Body Enclosures
Refuse Burners
Sifting Screen for Coal and Gravel
Open Mesh Drying Trays
Dripping Baskets
Icing Compartments of Refrigerator Cars
Reinforcing Cast Metals
Non-skid Platforms and Stair Treads
Binder for Mastic Floors
Display and Exhibit Racks
In Sheet Metal Work
Ganister Lining—Refining Machinery
Removable Truck Trays
Steam Radiator Guards
Conveyor Guards
Light Forms of Grating

To this list may be added many other highly specialized uses. The list demonstrates, however, the extent to which Red Top Econo Mesh is employed in industry.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

RED TOP ECONO MESH PRODUCTS

SHELF-X FLAT MESH

Shelf-X provides many important advantages that are not found in wire mesh, wire rods or perforated metal.

Shelf-X is a workable material. It can be bent in any direction and shaped without impairing its strength or rigidity. Shelf-X can be readily welded to framing or to any material that can be welded.

Shelf-X because of its flat, smooth surface and the small-sized mesh provides a new non-tipping feature. Small objects can be slid over Shelf-X without the danger of tipping and it therefore lends itself for shelving material in Refrigerators, Stoves, Cabinets, etc. Because of the flat surface of Shelf-X it is sanitary and easy to keep clean. Shelf-X is attractive in design, making it ideally suitable for grille work in heating and ventilating units, for household utensils and appliances and safety guards.

SHELF-X FEATURES

Flat Surface	Does Not Ravel
Rigid	Practical
Workable	Sanitary
No Mechanical Joints	Economical

AVAILABLE SIZES

(In Plain Steel)

Style Number		Weight Per Square Foot	Width (Short Way Diamond)	Length (Long Way Diamond)
1½	#16	.31	4′ 0″	8′ 0″
1½	#13	.65	4′ 0″	8′ 0″
1½	#9	1.19	4′ 0″	8′ 0″
1	#16	.47	4′ 0″	8′ 0″
¾	#16	.57	4′ 0″	8′ 0″
¾	#13	.87	4′ 0″	8′ 0″
¾	#9	1.80	4′ 0″	8′ 0″
½	#18	.70	4′ 0″	8′ 0″
½	#16	.87	4′ 0″	8′ 0″

Specify Style Number when ordering.

All above products can also be furnished galvanized, and in other metals such as stainless steel, bronze, etc.

GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
APBON & ALLO
STEELS
TOOL STEELS
DRILL RODS
STAINLESS AND T RESISTING STEELS
NDEX
nical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
UTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

RED TOP ECONO MESH PRODUCTS

EXPANDED METAL

AVAILABLE SIZES

(In Plain Steel)

Style Number		Weight Per Square Foot	Width (Short Way Diamond)	Length (Long Way Diamond)
1½	#16	.41	4′ 0″	8′ 0″
1½	#13	.65	4′ 0″ & 6′ 0″	8′ 0″
1½	#68	.68	4′ 0″ & 6′ 0″	8′ 0″
1½	#10	.79	4′ 0″ & 6′ 0″	8′ 0″
1½	#9	1.19	6′ 0″	8′ 0″
1	#16	.47	4′ 0″ & 6′ 0″	8′ 0″
¾	#16	.57	6′ 6″	8′ 0″
¾	#13	.87	4′ 0″ & 6′ 0″	*8′ 0″
¾	#10	1.19	4′ 0″	8′ 0″
¾	#9	1.80	4′ 0″	8′ 0″
½	#18	.70	4′ 0″ & 6′ 0″	8′ 0″
½	#16	.87	4′ 0″ & 6′ 0″	8′ 0″

RED TOP CONCRETE REINFORCING MESH

AVAILABLE SIZES

(In Plain Steel)

Style Number	Weight in Pounds Per Square Foot	Sectional Area Per Foot Width	Width (Short Way Diamond)
*3–13–075	.25	.075	6′ 4″
*3–13–10	.34	.10	7′ 0″
3–13–125	.42	.125	5′ 8″
*3–9–15	.51	.15	7′ 0″
3–9–175	.60	.175	6′ 0″
*3–9–20	.68	.20	5′ 3″
*3–9–25	.85	.25	4′ 2½″
*3–9–30	1.02	.30	7′ 0″
*3–9–35	1.19	.35	6′ 0″
*3–4–40	1.36	.40	4′ 7″
3–4–45	1.53	.45	4′ 1″
3–4–50	1.70	.50	7′ 4″
3–4–55	1.87	.55	6′ 8″
3–4–60	2.04	.60	6′ 1½″
2¼–13–10	.34	.10	7′ 0″
2¼–13–15	.51	.15	4′ 8″

*Standard Stock Sizes.

Specify Style Number when ordering.

All above products can also be furnished galvanized, and in other metals such as stainless steel, bronze, etc.

EXPANDED METAL ACCESSORIES

FOR INDUSTRIAL USE

FRAME BAR ITEMS
(Window and Door Guards)
- Frame Bars
- Frame Bar Corners
- Universal Clips
- Curved Hinges
- Spee-D Rivets

PARTITION BAR ITEMS
- Partition Bars
- Partition Bar Corners
- Top Brace Clamps
- Adjustable Floor Sockets
- Flat Hinges
- Spee-D Rivets

DOOR ITEMS
- Box Tracks
- Track Bracket
- No. 2 Hangers
- Spee-D Hangers
- Safety Locks
- Lock Keepers (For Sliding Doors)

MACHINE GUARD ITEMS
- U-Edge Framing (2 Sizes)
- Splice Bars
- Angle Irons
- Hot Rolled Channels
- No. 1 Standard Clips
- No. 2 Jumbo Clips
- Cast Iron Floor Sockets for 1″ x 1″ Angle

TOOLS AND EQUIPMENT
- Viking Shear (For Cutting Mesh)
- Miter Block (For Cutting and Mitering Frame Bars)
- Saw and Drill Jigs (For Cutting and Drilling Partition Bars)
- Mesh Tightener
- Rivet Sets

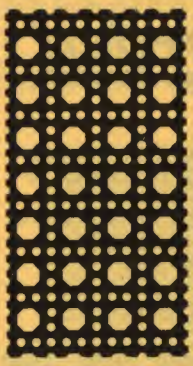
All materials: Pages 50-52.

We Are Exclusive Warehouse Distributors for RED TOP ECONO MESH PRODUCTS in This Territory

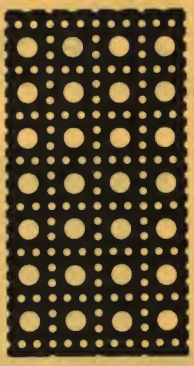
Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

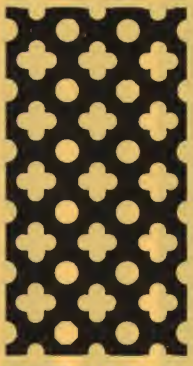
ORNAMENTAL PERFORATED METAL



CANE Style "A"
36% Open Area

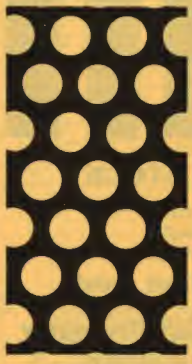


CANE Style "B"
40% Open Area

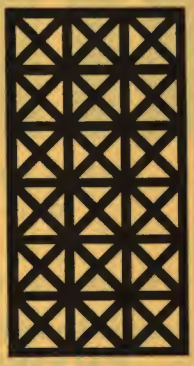


CLOVERLEAF Style "A"
40% Open Area

CLOVERLEAF Style "B"
51% Open Area



PERFORATED
MACHINERY GUARD
1/2" holes on 11/16" centers.



MALCANE
34% Open Area

STOCK SIZES

MACHINERY GUARD		OTHER PATTERNS	
U. S. Std. Gauge	Size Inches	U. S. Std. Gauge	Size Inches
20	36 x 96	22	24 x 96
	36 x 120		36 x 96
			36 x 120

Other than standard perforations can be furnished promptly.

GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
nical Data
UGES AND
EIGHTS
Extras for Size and Quantity
UTTING
XTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

HORACE T. POTTS CO.

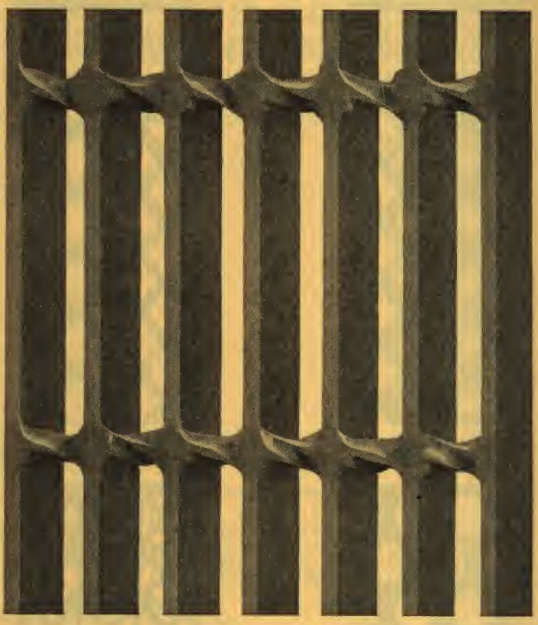
BLAW-KNOX

Electroforged

STEEL
GRATING and TREADS

ONE-PIECE CONSTRUCTION, STRENGTH, RIGIDITY, SLIP-PROOF, CLEAN, MORE LIGHT AND AIR

WAREHOUSE DISTRIBUTORS



SIZES CARRIED IN STOCK

G 21— ¾″ x 3/16″ BARS
J 21—1″ x 3/16″ BARS
L 21—1¼″ x 3/16″ BARS

12′ AND 24″ WIDE—20′ LONG PANEL

Special Lengths Can be Cut Promptly

GALVANIZED OR PAINTED

OTHER SIZES FURNISHED PROMPTLY FROM MILL

Perfect satisfaction assured for Stairways and Steps, Runways, Flooring in Power Houses, Engine Rooms, Gas Plants, Ventilating Shafts and Hatchways, Where a Non-Slip Flooring is Needed.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

BLAW-KNOX ELECTROFORGED STAIR TREADS

WITH SPECIAL CHECKERED PLATE NOSINGS

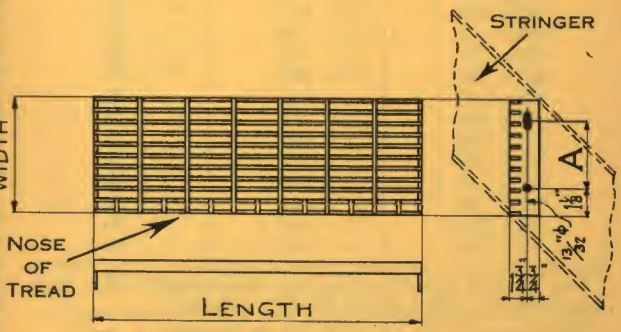
STANDARD SIZES AND SPECIFICATIONS

TYPE "J"—1" x 3/16" BARS

Width	Minimum Length	Suggested Max. Length	A
6 1/16"	1'6"	3'0"	2 1/2"
7 1/4"	1'6"	3'0"	4 1/2"
8 7/16"	1'6"	3'6"	4 1/2"
9 5/8"	1'6"	3'6"	7"
10 13/16"	1'6"	3'6"	7"

TYPE "L"—1 1/4" x 3/16" BARS

Width	Minimum Length	Suggested Max. Length	A
7 1/4"	2'0"	4'0"	4 1/2"
8 7/16"	2'0"	4'0"	4 1/2"
9 5/8"	2'0"	4'0"	7"
10 13/16"	2'0"	4'6"	7"
12"	2'0"	4'6"	7"



TO SUIT YOUR REQUIREMENTS

GRATING
STAIR TREADS
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
DRILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
hnical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

"AW" DIAMOND PATTERN FLOOR PLATES

Estimated Weight Per Square Foot

No. 16—2.875 lbs.	1/8— 6.125 lbs.	5/16—13.80 lbs.
No. 14—3.50 lbs.	3/16— 8.70 lbs.	3/8—16.35 lbs.
No. 12—5.50 lbs.	1/4—11.25 lbs.	1/2—21.45 lbs.

"AW" Super-Diamond Pattern

"AW" Standard Diamond

(Standard Diamond, Diamondette and Ribbed Patterns can be supplied on request.)

U. S. Std. Gauge and Size in Inches	Estimated Weight Per Plate Pounds	Net Extra For Size
9/16 x 24 x 48	70	.20
24 x 72	104	.20
24 x 96	139	.20
24 x 120	174	.20
24 x 144	209	.20
24 x 240	348	.20
30 x 48	87	.20
30 x 72	131	.20
30 x 96	174	.20
30 x 120	218	.20
30 x 144	261	.20
30 x 240	435	.20
36 x 48	104	.20
36 x 72	157	.20
36 x 96	209	.20
36 x 120	261	.20
36 x 144	313	.20
36 x 288	626	.20
42 x 48	122	.20
42 x 72	183	.20
42 x 96	244	.20
42 x 120	305	.20
42 x 144	365	.20

The weights shown above are approximate only, and may vary according to the size of the plate.

Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

"AW" DIAMOND PATTERN FLOOR PLATES

Size Inches	Estimated Weight Per Plate Pounds	Net Extra For Size
3/16 x 42 x 288	731	.20
48 x 48	139	.20
48 x 72	209	.20
48 x 96	278	.20
48 x 120	348	.20
48 x 144	418	.20
48 x 288	835	.20
60 x 96	348	.20
60 x 120	435	.20
60 x 144	522	.20
60 x 240	870	.20
1/4 x 24 x 48	90	Base
24 x 72	135	Base
24 x 96	180	Base
24 x 120	225	Base
24 x 144	270	Base
24 x 288	540	Base
30 x 48	113	Base
30 x 72	169	Base
30 x 96	225	Base
30 x 120	281	Base
30 x 144	338	Base
30 x 288	675	Base
36 x 48	135	Base
36 x 72	203	Base
36 x 96	270	Base
36 x 120	338	Base
36 x 144	405	Base
36 x 288	810	Base
42 x 48	158	Base
42 x 72	236	Base
42 x 96	315	Base
42 x 120	394	Base
42 x 144	473	Base
42 x 288	945	Base
48 x 48	180	Base
48 x 72	270	Base
48 x 96	360	Base
48 x 120	450	Base
48 x 144	540	Base
48 x 288	1080	Base
60 x 96	450	Base
60 x 120	563	Base
60 x 144	675	Base
60 x 288	1350	Base
5/16 x 30 x 48	138	Base
30 x 72	207	Base
30 x 96	276	Base
30 x 120	345	Base
30 x 144	414	Base
30 x 288	828	Base

The weights shown above are approximate only, and may vary according to the size of the plate.

Warehouse Quantity Extras and Deductions: Page 295.
Warehouse Cutting Extras: Pages 303-304.

Page No.
"AW" Super Diamond Pattern 56-58
Flame Cutting 59-60
Universal Mill and Sheared 61-63
High Carbon Steel Plates 64
Weartuf 65
STEEL PLATES
USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
DRILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
hnical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
UTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

"AW" DIAMOND PATTERN FLOOR PLATES

Size Inches	Estimated Weight Per Plate Pounds	Net Extra For Size
5/16 x 36 x 48	166	Base
36 x 72	248	Base
36 x 96	331	Base
36 x 120	414	Base
36 x 144	497	Base
36 x 288	994	Base
42 x 48	193	Base
42 x 72	390	Base
42 x 96	386	Base
42 x 120	483	Base
42 x 144	580	Base
42 x 288	1159	Base
48 x 48	221	Base
48 x 72	331	Base
48 x 96	442	Base
48 x 120	552	Base
48 x 144	662	Base
48 x 288	1325	Base
60 x 96	552	Base
60 x 120	690	Base
60 x 288	1656	Base
3/8 x 30 x 48	164	Base
30 x 72	245	Base
30 x 96	327	Base
30 x 120	409	Base
30 x 144	491	Base
30 x 288	981	Base
36 x 48	196	Base
36 x 72	294	Base
36 x 96	392	Base
36 x 120	491	Base
36 x 144	589	Base
36 x 288	1177	Base
42 x 48	229	Base
42 x 72	343	Base
42 x 96	458	Base
42 x 120	572	Base
42 x 144	687	Base
42 x 288	1373	Base
48 x 48	262	Base
48 x 72	392	Base
48 x 96	523	Base
48 x 120	654	Base
48 x 144	785	Base
48 x 288	1570	Base
60 x 96	654	Base
60 x 120	818	Base
60 x 144	981	Base
60 x 288	1962	Base
1/2 x 60 x 144	1287	Base
60 x 288	2574	Base

The weights shown above are approximate only, and may vary according to the size of the plate.

Thickness is measured through body of plate, i.e., exclusive of pattern.

Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

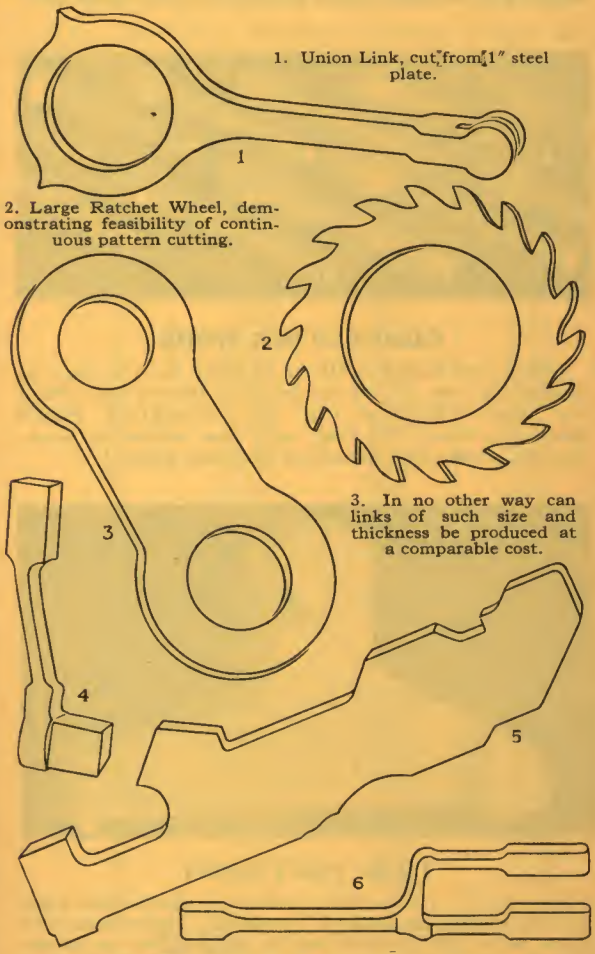
MECHANICAL FLAME CUTTING

Important economies can now be secured in the field of welded fabrication by the use of MECHANICAL FLAME-CUT parts. With modern equipment that is the latest in capacity, efficiency and speed, we are prepared to cut any shape of almost any width, length and thickness. Our large and varied warehouse stock makes selection of the right steel a simple matter and we can offer the greatest accuracy in the cutting, no matter how intricate the contour.

A blueprint or sketch of the part needed, with information of the service it is to perform, will enable us to supply the proper steel, cut to shape with the minimum of waste.

Prompt attention given to all inquiries for prices, deliveries, etc.

Some typical MECHANICAL FLAME-CUT parts are shown below:



1. Union Link, cut from 1" steel plate.

2. Large Ratchet Wheel, demonstrating feasibility of continuous pattern cutting.

3. In no other way can links of such size and thickness be produced at a comparable cost.

4. Radius Bar for motion work, cut from 5" steel plate.
5. Side Frame for Press, another low cost and very practical operation.
6. Combination Lever . . . all sides flame cut.

USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
APBON & ALLOY
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
nical Data
AUGES AND
VEIGHTS
Extras for Size and Quantity
UTTING
XTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

These Illustrations Are Typical of the Adaptability of Mechanical Flame-Cut Plates to Fabrication by Welding

PLATES FOR TURRET PUNCH PRESSES

Length 41¼″—width 29½″—depth of throat 19½″. MECHANICAL FLAME-CUT from 1¼″ steel plate. Sand-blasted one side for better application of paint. Edges were so smooth that no finishing was required.

CONNECTING RODS

Heads were MECHANICAL FLAME-CUT to exacting dimensions from .35/.45 carbon Open Hearth Steel Plate, 1¾″ thick. Rods of 1 9/16″ dia. ELASTUF PENN Machinery Steel, 17″ long, were then welded to heads, and the whole part normalized and sand-blasted.

TOOL POST BODY

Base 31⅝″—height 18¾″—body 4″ thick—Flat Lugs ½″ thick—Round Lugs 6″ diameter, 1¾″ thick. All parts were MECHANICAL FLAME-CUT to exceptionally close dimensions, the parts welded together, and the whole unit sand-blasted. Important savings were effected in first costs and finishing operations.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

STEEL PLATES

UNIVERSAL MILL AND SHEARED

Estimated Weight per Square Foot

3/16"— 7.65 lbs.	7/8"—35.70 lbs.	2¼"— 91.80 lbs.
¼"—10.20 "	1" —40.80 "	2½"—102.00 "
5/16"—12.75 "	1⅛"—45.90 "	3" —122.40 "
3/8"—15.30 "	1¼"—51.00 "	3½"—142.80 "
½"—20.40 "	1½"—61.20 "	4" —163.20 "
5/8"—25.50 "	1¾"—71.40 "	5" —204.00 "
¾"—30.60 "	2" —81.60 "	6" —244.80 "

Grade—Hot Rolled, S. A. E. 1010

Size Inches	Estimated Weight Per Lineal Foot	Net Extra For Size	Stock Lengths Feet

For sizes 3/16" thick and less than 24" wide, see Hot Rolled Strip, Page 37. For sizes 3/16" thick and 24" to 48" wide, inclusive, see Hot Rolled Sheets, Page 67.

3/16 x 60	38.25	.20	5–24
72	45.90	.20	5–24
84	53.55	.70	5–24
96	61.28	.80	5–24
¼ x 7	5.95	Base	5–22
8	6.80	Base	5–22
9	7.65	Base	5–22
10	8.50	Base	5–22
12	10.20	Base	5–24
14	11.90	Base	5–24
16	13.60	Base	5–24
18	15.30	Base	5–24
20	17.00	Base	5–24
22	18.70	Base	5–24
24	20.40	Base	5–24
30	25.50	Base	5–24
36	30.60	Base	5–24
42	35.70	Base	5–24
48	40.80	Base	5–24
60	51.00	Base	5–24
72	61.20	Base	5–24
84	71.40	Base	5–24
96	81.60	Base	5–24
5/16 x 7	7.44	Base	5–22
8	8.50	Base	5–22
9	9.56	Base	5–22
10	10.62	Base	5–22
12	12.75	Base	5–30
14	14.88	Base	5–30
16	17.00	Base	5–30
18	19.12	Base	5–30
20	21.25	Base	5–30
24	25.52	Base	5–30

Note: Above weights are estimated. Plates are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

STEEL PLATES
UNIVERSAL MILL AND SHEARED

Size Inches	Estimated Weight Per Lineal Foot	Net Extra For Size	Stock Lengths Feet
Grade—Hot Rolled, S. A. E. 1010			
5/16 x 30	31.88	Base	5–30
36	38.25	Base	5–30
48	51.00	Base	5–30
60	63.75	Base	5–30
72	76.50	Base	5–30
84	89.25	Base	5–30
96	102.00	Base	5–30
3/8 x 7	8.93	Base	5–22
8	10.20	Base	5–22
9	11.48	Base	5–22
10	12.75	Base	5–22
12	15.30	Base	5–22
14	17.85	Base	5–22
16	20.40	Base	5–22
18	22.95	Base	5–22
20	25.50	Base	5–22
24	30.60	Base	5–30
30	38.25	Base	5–30
36	45.90	Base	5–30
48	61.20	Base	5–30
60	76.50	Base	5–30
72	91.80	Base	5–30
84	107.12	Base	5–30
96	122.40	Base	5–30
Grade—Hot Rolled, S. A. E. 1020			
1/2 x 7	11.90	Base	5–22
8	13.60	Base	5–22
9	15.30	Base	5–22
10	17.00	Base	5–22
12	20.40	Base	5–22
14	23.80	Base	5–22
16	27.20	Base	5–22
18	30.60	Base	5–22
20	34.00	Base	5–22
24	40.80	Base	5–30
30	51.00	Base	5–30
36	61.20	Base	5–30
48	81.60	Base	5–30
60	102.00	Base	5–30
72	122.40	Base	5–30
84	142.80	Base	5–30
96	163.20	Base	5–30
5/8 x 7	14.88	Base	5–22
8	17.00	Base	5–22
9	19.13	Base	5–22
10	21.25	Base	5–22
12	25.50	Base	5–22
14	29.75	Base	5–22
16	34.00	Base	5–22
18	38.25	Base	5–22
20	42.50	Base	5–22
24	51.00	Base	5–30
36	76.50	Base	5–30
48	102.00	Base	5–30
60	127.50	Base	5–30

Note: Above weights are estimated. Plates are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

STEEL PLATES

UNIVERSAL MILL AND SHEARED

Grade—Hot Rolled, S. A. E. 1020

Size Inches	Estimated Weight Per Lineal Foot	Net Extra For Size	Stock Lengths Feet
¾ x 7	17.85	Base	5–22
8	20.40	Base	5–22
9	22.95	Base	5–22
10	25.50	Base	5–22
12	30.60	Base	5–22
14	35.70	Base	5–22
16	40.80	Base	5–22
18	45.90	Base	5–22
20	51.00	Base	5–22
24	61.20	Base	5–30
36	91.80	Base	5–30
48	122.40	Base	5–30
60	153.00	Base	5–30
⅞ x 8	23.80	Base	5–22
60	178.50	Base	5–30
1 x 7	23.80	Base	5–22
8	27.20	Base	5–22
10	34.00	Base	5–22
12	40.80	Base	5–22
14	47.60	Base	5–22
16	54.40	Base	5–22
18	61.20	Base	5–22
20	68.00	Base	5–22
24	81.60	Base	5–30
36	122.40	Base	5–30
48	163.20	Base	5–30
60	204.00	Base	5–30
1⅛ x 60	229.50	Base	5–30
1¼ x 7	29.75	Base	5–22
8	34.00	Base	5–22
60	255.00	Base	5–30
1½ x 7	35.70	Base	5–22
8	40.80	Base	5–22
60	306.00	Base	5–30
1¾ x 60	357.00	Base	5–30
2 x 7	47.60	Base	5–22
8	54.40	Base	5–22
60	408.00	Base	5–30
2¼ x 48	367.20	.10	15
2½ x 48	408.00	.10	15
3 x 48	489.60	.10	15
3½ x 48	571.20	.10	15
4 x 48	652.80	.10	15
5 x 48	816.00	.15	15
6 x 48	979.92	.15	15

Note: Above weights are estimated. Plates are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

Flame Cutting: Plates over 1″ thick are Flame Cut to Regular or Special Shapes: Pages 303-304.

USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
DRILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
nical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
UTTING
XTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

HIGH CARBON STEEL PLATES

.35/.45 CARBON—OPEN HEARTH STEEL

S. A. E. 1040—Within the range of A. S. T. M. Specifications A-17-29, Class 6, and A-19-36.

Physical Properties

The following are approximate tensile figures for High Carbon Steel Plates:

Tensile Strength	75/85,000 lbs. per sq. in.
Yield Point	40/50,000
Elongation in 2"	20/30%
Reduction of Area	35/45%
Brinell	160/200

Above physicals represent figures usually obtained from 1½" thick.

Applications

High Carbon Steel Plates have higher physical properties than ordinary Tank Steel Plates, with good machinability. The high carbon also offers good resistance to wear and abrasion. The application of High Carbon Steel Plates is wide, some of the typical uses following:

- Die Plates and Bolsters
- Stripping Plates
- Moulds
- Wearing Plates
- Heavy Duty Machine Parts
- Plate Parts for the following:
  - Mining, Quarrying, Stone-Crushing Machinery
  - Stamping and Drawing Processes
  - Paper and Printing Machinery
  - Heavy Duty Textile Machinery (especially Broad Looms)
  - Materials Moving Machinery

Fabrication

High Carbon Steel Plates machine without tear or drag and the most intricate machining can be taken care of with confidence. These plates may also be formed, bent, welded, etc.

We can furnish accurately flame cut to size and shape, any size required.

HIGH CARBON STEEL PLATES

Thickness	Weight per Sq. Ft.
½"	20.40 lbs.
⅝"	25.50 "
¾"	30.60 "
1"	40.80 "
1¼"	51.00 "
1½"	61.20 "
1¾"	71.40 "
2"	81.60 "
2¼"	91.80 "
2½"	102.00 "
3"	122.40 "

Note: Above weights are estimated. Plates are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

Flame Cutting: Plates over 1" thick are Flame Cut to regular or special shape: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

WEARTUF

ABRASION RESISTING STEEL SHEETS AND PLATES

A new steel developed to meet the demand for a low priced material for those jobs where resistance to wear and abrasion is of prime importance.

Characteristics

A Carbon-Manganese-Silicon type of analysis with a normal Brinell of approximately 235 and Tensile Strength about 115/130,000 lbs. per sq. inch. WEARTUF is usually stocked in this range but can be supplied up to about 300 Brinell.

Applications

Being low in price WEARTUF can be economically used for those jobs where the cost of high Manganese Alloy is prohibitive.

WEARTUF will give many times the life of ordinary steel and compares favorably with more expensive alloy steel. The following are a few of the typical applications:

- Scraper Blades
- Conveyor Buckets
- Liners for Loaders, Mixers, Hoppers
- Shovel and Dipper Lips
- Dredge Pipe
- Dredge Pump Liners
- Sand, Gravel, Coal Chutes, and Screens
- Screw Conveyor Flights
- Truck and Car Bottoms
- Moulds for Abrasive Materials
- Sheathing for Power Shovel Dipper Sticks and Booms
- Cement and Concrete Handling Equipment

Fabrication

WEARTUF can be bent, formed, machined and welded. Refer application to us for detailed recommendations on fabrication.

Our usual Engineering service stands behind this steel and we shall be glad to study your wear and abrasion problems.

We can furnish accurately flame cut to size and shape, any size required.

WEARTUF

Thickness	Weight per Sq. Ft.
#10	5.74 "
3/16"	7.65 "
1/4"	10.20 "
5/16"	12.75 "
3/8"	15.30 "

USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
RILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
hnical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
UTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

USS COR-TEN HIGH TENSILE STEEL

USS COR-TEN Steel is a ductile low carbon-chromium-copper-silicon-phosphorus steel with a minimum yield point of 50,000 lbs. per sq. in., and a minimum tensile strength of 70,000 lbs. per sq. in. USS COR-TEN is a patented steel, and may be welded and fabricated with only slight changes in shop practice. Field tests as well as actual applications have proved USS COR-TEN'S adaptability . . . for elevator buckets, coal buckets, mine cars, dump cars, railroad cars, trailers, moving vans, trucks, buses, street cars, barges, river boats, dredges, blast plates, smoke stacks, industrial roofing and siding . . . where conditions require a corrosion resisting steel with high physical properties.

TABLE OF PHYSICAL PROPERTIES OF USS COR-TEN

NOTE: Table shows physical properties of USS COR-TEN High Tensile Steel Plates, Shapes, Bars, Sheets, Strip, and other products ¾″ thick and under.

Yield Point, lbs. per sq. in.	50,000 Min.*
Tensile Strength, lbs. per sq. in	70,000 Min.*
Elongation, per cent in 8 ins., 3/16″ and over	1,500,000 Min.†
	T. S.
Elongation, per cent in 2 ins., under 3/16″ (based on 2″ specimen)	22 Min.
Cold Bend	180° d = t
Atmospheric Corrosion Resistance compared with carbon steel	4 to 6

*For material over ¾″ thick, up to 2″ inclusive, yield point and tensile strength will be reduced 5,000 lbs. per sq. in. This reduction is also applicable to this steel when specified in the annealed condition, excepting light plates, sheets and strip.

†For material under 5/16″ to 3/16″ inclusive in thickness or diameter, reduce elongation 1.25% for each decrease of 1/32″ below 5/16″.

USS COR-TEN SHEETS AND PLATES

Stock Sizes

SHEETS		PLATES	
U. S. Std. Gauge Size Inches	Estimated Weight Per Sheet Pounds	Thickness Inches Size Inches	Estimated Weight Per Plate Pounds
18 x 48 x 120″	80	3/16 x 48 x 120″	306
16 x 60 x 144″	150	¼ x 48 x 120″	408
14 x 60 x 144″	191	⅜ x 48 x 120″	612
12 x 60 x 144″	262		
10 x 60 x 144″	338		

Other sizes of USS COR-TEN available promptly.
Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

USS MAN-TEN HIGH TENSILE STEEL

USS MAN-TEN Steel is a copper-manganese steel with a minimum yield point of 50,000 lbs. per sq. in., and a minimum tensile strength of 80,000 lbs. per sq. in., and is used under conditions requiring a steel of high tensile strength properties where corrosion is not so important. USS MAN-TEN is usually furnished with 0.20 minimum copper, giving it atmospheric corrosion resisting properties equal to carbon steel with the same copper content. USS MAN-TEN may readily be welded and fabricated with only slight, if any, modifications in shop technique; and this steel has been successfully applied, because of its great strength and high abrasion and fatigue resistance, to concrete mixer shells and vanes, car dumpers, hoppers of dredges and ore boats, heavy duty trail cars, trailers, mine cages, stripping shovels, coal vibrating screens, mine cars, walking beams of oil well derricks, Tainter and Roller gates of dams, crane girders, and many other applications.

TABLE OF PHYSICAL PROPERTIES OF USS MAN-TEN

NOTE: Table shows physical properties of USS MAN-TEN High Tensile Steel Plates, Shapes, Bars, Sheets, Strip, and other products ¾" thick and under.

Yield Point, lbs. per sq. in	50,000 Min.*
Tensile Strength, lbs. per sq. in	80,000 Min.*
Elongation, per cent in 8 ins., ⅜" and over	1,500,000 Min.†
	T. S.
Elongation, per cent in 2 ins., under ⅜" (based on 2" specimen)	20 Min.
Cold Bend	180° d = t
Atmospheric Corrosion Resistance compared with carbon steel	2 to 3

*For material over ¾" thick, up to 2" inclusive, yield point and tensile strength will be reduced 5,000 lbs. per sq. in. This reduction is also applicable to this steel when specified in the annealed condition, excepting light plates, sheets and strip.

†For material under 5/16" to ⅜" inclusive in thickness or diameter, reduce elongation 1.25% for each decrease of 1/32" below 5/16".

USS MAN-TEN available promptly from mill.

USS COR-TEN
USS MAN-TEN
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
DRILL RODS
STAINLESS AND
T RESISTING STEELS
NDEX
hnical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
UTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

HOT ROLLED STEEL SHEETS

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Net Extra For Size	U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Net Extra For Size
16	24 x 96	40	.45	12	24 x 96	70	.10
	24 x 120	50	.45		24 x 120	88	.10
	26 x 96	43	.45		26 x 96	76	.10
	28 x 96	47	.45		28 x 96	82	.10
	30 x 96	50	.45		30 x 96	88	.10
	30 x 120	63	.45		30 x 120	109	.10
	32 x 96	54	.45		32 x 96	94	.10
	34 x 96	56	.45		34 x 96	100	.10
	36 x 96	60	.45		36 x 96	105	.10
	36 x 120	75	.45		36 x 120	131	.10
	36 x 144	90	.45		36 x 144	158	.10
	38 x 96	63	.45		38 x 96	111	.10
	40 x 96	67	.45		40 x 96	117	.10
	42 x 96	70	.45		42 x 96	123	.10
	44 x 96	73	.45		44 x 96	130	.10
	46 x 96	76	.45		46 x 96	136	.10
	48 x 96	80	.45		48 x 96	142	.10
	48 x 120	100	.45		48 x 120	175	.10
	48 x 144	120	.45		48 x 144	210	.10
	60 x 96	100	.50		60 x 96	175	.25
	60 x 120	125	.50		60 x 120	219	.25
	60 x 144	150	.50		60 x 144	262	.25
14	24 x 96	50	.20	10	24 x 96	90	Base
	26 x 96	54	.20		24 x 120	113	Base
	28 x 96	58	.20		26 x 96	98	Base
	30 x 96	63	.20		28 x 96	105	Base
	32 x 96	68	.20		30 x 96	113	Base
	34 x 96	72	.20		30 x 120	141	Base
	36 x 96	77	.20		32 x 96	120	Base
	36 x 120	94	.20		34 x 96	128	Base
	36 x 144	113	.20		36 x 96	135	Base
	38 x 96	81	.20		36 x 120	169	Base
	40 x 96	85	.20		36 x 144	203	Base
	42 x 96	90	.20		38 x 96	143	Base
	44 x 96	94	.20		40 x 96	150	Base
	46 x 96	98	.20		42 x 96	158	Base
	48 x 96	103	.20		44 x 96	165	Base
	48 x 120	125	.20		46 x 96	173	Base
	48 x 144	150	.20		48 x 96	180	Base
	60 x 96	128	.35		48 x 120	225	Base
	60 x 120	160	.35		48 x 144	270	Base
	60 x 144	191	.35		60 x 96	230	.15
					60 x 120	281	.15
					60 x 144	338	.15
					72 x 144	406	.25

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

HOT ROLLED STEEL SHEETS

Size Inches	Estimated Weight Per Sheet Pounds	Net Extra For Size
3/16 x 14 x 240	8.93	Base
16 x 240	10.20	Base
18 x 240	11.48	Base
20 x 240	12.75	Base
22 x 240	14.02	Base
24 x 96	122.4	Base
24 x 120	153.0	Base
24 x 144	183.6	Base
24 x 168	214.2	Base
24 x 192	244.8	Base
24 x 240	306.0	Base
24 x 288	367.2	Base
30 x 96	153.0	Base
30 x 120	191.3	Base
30 x 144	229.5	Base
30 x 168	267.8	Base
30 x 192	306.0	Base
30 x 240	382.6	Base
30 x 288	459.0	Base
36 x 96	183.6	Base
36 x 120	229.5	Base
36 x 144	275.4	Base
36 x 168	321.1	Base
36 x 192	367.2	Base
36 x 240	459.0	Base
36 x 288	550.8	Base
42 x 96	214.2	Base
42 x 120	267.8	Base
42 x 144	321.3	Base
42 x 168	374.9	Base
42 x 192	428.4	Base
42 x 240	535.6	Base
48 x 96	244.8	Base
48 x 120	306.0	Base
48 x 144	367.2	Base
48 x 168	428.4	Base
48 x 192	489.6	Base
48 x 240	612.0	Base
48 x 288	734.4	Base

For widths under 24″—see Hot Rolled Strip Steel: Page 37.

For widths over 48″—see Steel Plates: Page 61.

BRING YOUR WIRE ROPE AND SLING PROBLEMS TO US

In addition to carrying complete WAREHOUSE STOCKS of Macwhyte Internally Lubricated WIRE ROPE, we offer without obligation, competent engineering service on all rope problems. Macwhyte Atlas Slings wil. enable you to lift your heaviest loads, safely and economically. They are non-rotating and non-kinking.

Let us help you select the cable or sling that will meet *your* construction and handling requirements most efficiently. See pages 114-120 for Macwhyte Wire Rope and Slings.

Page No.
H. R. Sheets Blue Annealed 66-67
H. R. Annealed 68
Supremo Auto Body Sheets 69
Galvanized 70-71
Beth-Cu-Loy 72-73
Corrugated Galvanized 78-79
STEEL SHEETS
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
STEELS
TOOL STEELS
DRILL RODS
STAINLESS AND
T RESISTING STEELS
INDEX
hnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

HOT ROLLED ANNEALED

STEEL SHEETS

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets per Bundle	Net Extra For Size
28	24 x 96	10.00	15	+1.10
	30 x 96	12.50	12	+1.10
	36 x 96	15.00	10	+1.30
27	24 x 96	11.00	13	+1.05
	30 x 96	13.75	11	+1.05
	36 x 96	16.50	9	+1.20
26	24 x 96	12.00	12	+1.00
	30 x 96	15.00	10	+1.00
	36 x 96	18.00	8	+1.10
24	24 x 96	16.00	9	+ .90
	30 x 96	20.00	7	+ .90
	30 x 120	25.00	6	+ .90
	36 x 96	24.00	6	+ .90
	36 x 120	30.00	5	+ .90
22	24 x 96	20.00	7	+ .85
	30 x 96	25.00	6	+ .85
	30 x 120	31.25	5	+ .85
	36 x 96	30.00	5	+ .85
	36 x 120	37.50	4	+ .85
	48 x 96	40.00	4	+1.05
20	24 x 96	24.00	6	+ .80
	30 x 96	30.00	5	+ .80
	30 x 120	37.50	4	+ .80
	36 x 96	36.00	4	+ .80
	36 x 120	45.00	3	+ .80
	48 x 96	48.00	3	+ .80
	48 x 120	60.00	2	+ .80
18	24 x 96	32.00	5	+ .75
	30 x 96	40.00	4	+ .70
	30 x 120	50.00	3	+ .70
	36 x 96	48.00	3	+ .70
	36 x 120	60.00	2	+ .70
	42 x 96	56.00	3	+ .70
	48 x 96	64.00	2	+ .70
	48 x 120	80.00	2	+ .70

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Cutting Extras: Pages 303-304.

We call your attention to the unusually full line of sizes we carry in Hot Rolled Box Annealed, Galvanized and Hot Rolled Blue Annealed, in both Soft Steel and Armco Ingot Iron, which will often permit of considerable saving by cutting to size with m inimum waste.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

SUPREMO AUTO BODY SHEETS

This is a superior grade of silver finished sheets for fine body work and similar purposes. These are stretcher levelled and resquared. All sheets are oiled.

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds
22	30 x 96	25.00	20	36 x 144	54.00
	36 x 96	30.00		40 x 120	50.00
	36 x 120	37.50		42 x 120	53.50
20	30 x 96	30.00		48 x 96	48.00
	36 x 96	36.00		48 x 120	60.00
	36 x 120	45.00		48 x 144	72.00

Other sizes and gauges, not listed above, can be supplied immediately.

All shipments of this material, other than by truck, are crated and charged for at cost.

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

COLD ROLLED SHEETS AND PLATES

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Net Extra For Size
10	48 x 96	180	Base
3/16	48 x 96	245	Base
1/4	48 x 96	326	Base

ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
APBON & ALLO
STEELS
TOOL STEELS
DRILL RODS
STAINLESS AND
T RESISTING STEELS
NDEX
nical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

GALVANIZED

STEEL SHEETS

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets per Bundle	Net Extra For Size
29	30 x 96	14.4	10	+.75
28	24 x 96	12.50	12	+.50
	30 x 96	15.62	10	+.50
	30 x 120	19.53	8	+.50
	36 x 96	18.75	8	+.70
	36 x 120	23.44	7	+.70
27	24 x 96	13.50	11	+.35
	30 x 96	16.87	9	+.35
	30 x 120	21.09	7	+.35
	36 x 96	20.25	8	+.40
	36 x 120	25.31	6	+.40
26	24 x 96	14.50	10	+.25
	30 x 72	13.59	11	+.25
	30 x 84	15.86	10	+.25
	30 x 96	18.12	8	+.25
	30 x 108	20.25	7	+.25
	30 x 120	22.66	7	+.25
	30 x 144	27.18	5	+.35
	36 x 96	21.75	7	+.25
	36 x 120	27.19	6	+.25
	48 x 96	29.00	5	+1.25
	48 x 120	36.25	4	+1.75
24	24 x 96	18.50	8	Base
	30 x 72	17.34	9	Base
	30 x 84	20.23	7	Base
	30 x 96	23.12	7	Base
	30 x 108	25.88	6	Base
	30 x 120	28.91	5	Base
	30 x 144	34.68	4	+.10
	36 x 96	27.75	6	Base
	36 x 120	34.69	5	Base
	48 x 96	37.00	4	+.75
	48 x 120	46.20	3	+.75
22	24 x 96	22.50	7	−.05
	30 x 72	21.09	7	−.05
	30 x 84	24.61	6	−.05
	30 x 96	28.12	5	−.05
	30 x 108	31.50	5	−.05
	30 x 120	35.16	4	−.05
	30 x 144	42.18	4	+.05
	36 x 96	33.75	5	−.05
	36 x 120	42.19	4	−.05
	48 x 96	45.00	3	+.60
	48 x 120	56.20	3	+.60

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Cutting Extras: Pages 303-304.

PFEIFER CLIPS
AND
SURGRIP ROOFING NAILS
See page 80

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

GALVANIZED
STEEL SHEETS

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets per Bundle	Net Extra For Size
20	24 x 96	26.50	6	−.10
	30 x 72	24.84	6	−.10
	30 x 84	28.98	5	−.10
	30 x 96	33.12	5	−.10
	30 x 108	37.11	4	−.10
	30 x 120	41.41	4	−.10
	30 x 144	49.68	3	−.00
	36 x 96	39.75	4	−.10
	36 x 120	49.69	3	−.10
	48 x 96	53.00	3	+.30
	48 x 120	66.20	2	+.30
18	24 x 96	34.50	4	−.15
	30 x 96	43.12	4	−.15
	30 x 120	53.91	3	−.15
	36 x 96	51.75	3	−.15
	36 x 120	64.69	2	−.15
	48 x 96	69.00	2	+.10
	48 x 120	86.24	2	+.10
16	24 x 96	42.50	4	−.25
	30 x 96	53.12	3	−.25
	36 x 96	63.75	2	−.25
	36 x 120	79.69	2	−.25
	48 x 96	85.00	2	−.05
	48 x 120	106.24	1	−.05
14	30 x 96	65.62	2	−.30
	36 x 96	78.75	2	−.30
	36 x 120	98.44	2	−.30
	48 x 96	105.00	1	−.10
	48 x 120	131.24	1	−.10
12	30 x 96	90.62	2	−.40
	36 x 96	108.75	1	−.40
	36 x 120	135.94	1	−.40
	48 x 96	145.00	1	−.20
	48 x 120	181.24	1	−.20
10	30 x 96	115.62	2	−.50
	36 x 96	138.75	1	−.50
	36 x 120	173.44	1	−.50
	48 x 96	185.00	1	−.30
	48 x 120	231.24	1	−.30

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Cutting Extras: Pages 303-304.

PFEIFER CLIPS
AND
SURGRIP ROOFING NAILS

See page 80

ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
DRILL RODS
TAINLESS AND
T RESISTING STEELS
NDEX
hnical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
UTTING EXTRAS

COPPER BETH-CU-LOY BEARING

BETH-CU-LOY

COPPER-BEARING GALVANIZED SHEETS

resist atmospheric corrosion

Beth-Cu-Loy Copper-Bearing Steel is a special grade of refined open-hearth steel to which pure ingot copper has been added. The special composition of Beth-Cu-Loy makes its use highly desirable wherever unusual resistance to corrosion is desired.

In roofing, siding, eave troughs, conductor pipe, ventilators, refrigerator linings, furnace work, culverts, and in numerous other installations exposed to the atmosphere or subjected to alternate wet and dry conditions, sheets of Beth-Cu-Loy can be depended upon to give added years of service.

Beth-Cu-Loy Sheets not only offer high resistance to atmospheric corrosion but in addition, due to the unified control of all materials and processes entering into their manufacture, they possess physical properties which make them decidedly easy to form and fabricate.

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets per Bundle	Net Extra For Size
28 x	30 x 96	15.62	10	+.50
	36 x 96	18.75	8	+.70
27 x	36 x 96	20.25	8	+.40
26 x	24 x 96	14.50	10	+.25
	30 x 72	13.59	11	+.25
	30 x 84	15.86	10	+.25
	30 x 96	18.12	8	+.25
	30 x 108	20.25	7	+.25
	30 x 120	22.66	7	+.25
	30 x 144	27.18	6	+.35
	36 x 96	21.75	7	+.25

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Cutting Extras: Pages 303-304.

PFEIFER CLIPS AND SURGRIP ROOFING NAILS

See page 80

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COPPER BETH-CU-LOY BEARING

BETH-CU-LOY

COPPER-BEARING GALVANIZED SHEETS

resist atmospheric corrosion

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets per Bundle	Net Extra For Size
24	x 24 x 96	18.50	8	Base
	30 x 72	17.34	9	Base
	30 x 84	20.23	7	Base
	30 x 96	23.12	7	Base
	30 x 108	25.88	6	Base
	30 x 120	28.91	5	Base
	30 x 144	34.68	4	+.10
	36 x 96	27.75	6	Base
	36 x 120	34.69	5	Base
	48 x 96	37.00	4	+.75
22	x 24 x 96	22.50	7	−.05
	30 x 72	21.09	7	−.05
	30 x 84	24.61	6	−.05
	30 x 96	28.12	5	−.05
	30 x 108	31.50	5	−.05
	30 x 120	35.16	4	−.05
	30 x 144	42.18	4	+.05
	36 x 96	33.75	5	−.05
	36 x 120	42.19	4	−.05
	48 x 96	45.00	3	+.60
20	x 30 x 96	33.12	5	−.10
	30 x 120	41.41	4	−.10
	36 x 96	39.75	4	−.10
	36 x 120	49.69	3	−.10
	48 x 96	53.00	3	+.30
	48 x 120	66.20	2	+.30
18	x 36 x 96	51.75	3	−.15
	36 x 120	64.69	2	−.15
	48 x 120	86.24	2	+.10
16	x 30 x 96	53.12	3	−.25
	36 x 96	63.75	2	−.25
	36 x 120	79.69	2	−.25
	48 x 120	106.24	1	−.05
14	x 36 x 96	78.75	2	−.30
	48 x 120	131.24	1	−.10

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Cutting Extras: Pages 303-304.

ARMCO INGOT IRON

Analysis guaranteed Iron (min.)	99.94%
All other elements Carbon, Manganese, Phosphorus, Sulphur, Silicon, Copper, etc.	.06% max.
	100%

Rust resisting because of Purity. Economical because it outlasts ordinary iron and steel sheets under conditions which cause corrosion. Easy to fabricate and erect because of its ductility and good working qualities.

GALVANIZED SHEETS

ARMCO INGOT IRON

Remember—Erection of sheet metal costs more in labor than in material. Therefore—install ARMCO Ingot Iron because its longer life reduces the frequency of the labor cost.

The galvanized coat on ARMCO is heavy, and more free from the microscopic pit holes which in ordinary sheets quickly leave the surface exposed to RUST.

Use ARMCO Ingot Iron wherever maximum resistance to corrosion is essential.

For Roofs and Sidings for buildings, sheds, garages, etc. For gutters, flashings, down spouts, etc.

HOT ROLLED

ARMCO INGOT IRON

The maximum purity makes for longer service for Breechings, Stacks, Chutes, Tanks, Boilers, etc., Mine Cars, Water and Sewage Pipes, Dryers, Heaters, Humidifiers, Gas Tanks, Oil Tanks, Stand Pipes, Boiler Jackets and Brine Tanks.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

ARMCO INGOT IRON SHEETS

HOT ROLLED

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Net Extra For Size
16	24 x 96	40	+.45
	30 x 96	50	+.45
	36 x 96	60	+.45
	36 x 120	75	+.45
	48 x 96	80	+.45
	48 x 120	100	+.45
14	24 x 96	50	+.20
	30 x 96	63	+.20
	36 x 96	77	+.20
	36 x 120	94	+.20
	48 x 96	103	+.20
	48 x 120	125	+.20
12	24 x 96	70	+.10
	30 x 96	88	+.10
	36 x 96	105	+.10
	36 x 120	131	+.10
	48 x 96	142	+.10
	48 x 120	175	+.10
	48 x 144	210	+.10
10	24 x 96	90	Base
	30 x 96	113	Base
	36 x 96	135	Base
	36 x 120	169	Base
	48 x 96	180	Base
	48 x 120	225	Base
3/16	36 x 120	226	Base

PLATES

3/16	60 x 120	383	+.20
1/4	36 x 120	306	Base
	60 x 120	510	Base

ARMCO INGOT IRON SHEETS

HOT ROLLED ANNEALED

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets Per Bundle	Net Extra For Size
26	30 x 96	15.00	10	+1.00
	36 x 96	18.00	8	+1.10
24	30 x 96	20.00	7	+ .90
	36 x 96	24.00	6	+ .90
22	30 x 96	25.00	6	+ .85
	36 x 96	30.00	5	+ .85
20	30 x 96	30.00	5	+ .80
	36 x 96	36.00	4	+ .80
18	30 x 96	40.00	4	+ .70
	36 x 96	48.00	3	+ .70

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Cutting Extras: Pages 303-304.

Page No.
Armco 74 to 77
Hot Rolled 75
Hot Rolled Annealed 75
Plates 75
Galvanized 76-77
Corrugated Galvanized 78-79
ARMCO Ingot Iron
ROOFING
SIDING
WELDING WIRES
Accessories
BRASS
COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL STEELS
DRILL RODS
STAINLESS AND
T RESISTING STEELS
NDEX
hnical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

ARMCO INGOT IRON SHEETS
GALVANIZED

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets Per Bundle	Net Extra For Size
28	24 x 96	12.50	12	+.50
	30 x 96	15.62	10	+.50
	36 x 96	18.75	8	+.70
27	24 x 96	13.50	11	+.35
	30 x 96	16.87	9	+.35
	36 x 96	20.25	8	+.40
26	24 x 96	14.50	10	+.25
	30 x 72	13.59	11	+.25
	30 x 84	15.86	10	+.25
	30 x 96	18.12	8	+.25
	30 x 108	20.25	7	+.25
	30 x 120	22.66	7	+.25
	36 x 96	21.75	7	+.25
	36 x 120	27.19	6	+.25
24	24 x 96	18.50	8	Base
	30 x 72	17.34	9	Base
	30 x 84	20.23	7	Base
	30 x 96	23.12	7	Base
	30 x 108	25.88	6	Base
	30 x 120	28.91	5	Base
	30 x 144	34.68	4	+.10
	36 x 96	27.75	6	Base
	36 x 120	34.69	5	Base
	48 x 96	37.00	4	+.75
	48 x 120	46.20	3	+.75
22	24 x 96	22.50	7	−.05
	30 x 72	21.09	7	−.05
	30 x 84	24.61	6	−.05
	30 x 96	28.12	5	−.05
	30 x 108	31.50	5	−.05
	30 x 120	35.16	4	−.05
	30 x 144	42.18	4	+.05
	36 x 96	33.75	5	−.05
	36 x 120	42.19	4	−.05
	48 x 96	45.00	3	+.60
	48 x 120	56.20	3	+.60
20	24 x 96	26.50	6	−.10
	30 x 96	33.12	5	−.10
	30 x 120	41.41	4	−.10
	36 x 96	39.75	4	−.10
	36 x 120	49.69	3	−.10
	48 x 96	53.00	3	+.30
	48 x 120	66.20	2	+.30

Note: Above weights are estimated. Sheets are sold at actual weight, any difference from estimated weight being that allowable by standard rolling mill practice.

Warehouse Cutting Extras: Pages 303-304.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

ARMCO INGOT IRON SHEETS

GALVANIZED

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets per Bundle	Net Extra For Size
18	24 x 96	34.50	4	−.15
	30 x 96	43.12	4	−.15
	30 x 120	53.91	3	−.15
	36 x 96	51.75	3	−.15
	36 x 120	64.69	2	−.15
	48 x 96	69.00	2	+.10
	48 x 120	86.24	2	+.10
16	24 x 96	42.50	4	−.25
	30 x 96	53.12	3	−.25
	36 x 96	63.75	2	−.25
	36 x 120	79.69	2	−.25
	48 x 96	85.00	2	−.05
	48 x 120	106.24	1	−.05
14	30 x 96	65.62	2	−.30
	36 x 96	78.75	2	−.30
	36 x 120	98.44	2	−.30
	48 x 96	105.00	1	−.10
	48 x 120	131.24	1	−.10
12	30 x 96	90.62	2	−.40
	36 x 96	108.75	1	−.40
	36 x 120	135.94	1	−.40
	48 x 96	145.00	1	−.20
	48 x 120	181.24	1	−.20
10	36 x 96	138.75	1	−.50
	36 x 120	173.44	1	−.50
	48 x 96	185.00	1	−.30
	48 x 120	231.24	1	−.30

ELECTRICAL SHEETS

ARMCO INGOT IRON

Available for immediate shipment from warehouse or mill stock in sheets, hot or cold rolled strips and cold drawn bars.

Suitable for magnets, both cores and frames, where high permeability and low retentivity are essential.

Used widely in electrical equipment, radio apparatus, switches, etc.

Specially annealed to permit of bending, forming and drawing, with and against the grain.

Prices on application.

ELECTRICAL SHEETS

ARMCO STEEL

ARMCO Electrical Steel Sheets, all grades for all purposes, are available for quick mill shipment.

ARMCO was the Pioneer in developing Electrical Sheets and sets the standard today.

Prices and deliveries named on all specific inquiries.

CORRUGATED ROOFING AND SIDING

Stocks carried in

GALVANIZED STEEL
GALVANIZED COPPER BEARING STEEL
GALVANIZED ARMCO INGOT IRON

See next page for sizes.

We have our own corrugating machine and can corrugate special sizes.

Capacity:

2½″ corrugations, 28 to 16 gauge, inclusive.

1¼″ corrugations, 28 to 20 gauge, inclusive.

15″ to 36″ wide (before corrugating) up to 144″ long.

When desired, we will gladly corrugate customers' own material at reasonable prices; steel, iron, aluminum, copper, duralumin, etc.

2½″ Corrugations:

28″ wide sheet will finish to 26″ over all—9 full corrugations to width of sheet—both edges after corrugating will be down.

30″ wide sheet will finish to 27½″ over all—10½ full corrugations to width of sheet—one edge will be up and the other down after corrugating.

36″ wide sheet will finish to 33½″ over all—12½ full corrugations to width of sheet—one edge will be up and the other down after corrugating.

We can ship immediately in gauges 20-22-24-26 by 1¼″ and 2½″ corrugations, 6 to 12 ft. lengths; galvanized, black, and painted—Steel, Beth-Cu-Loy and ARMCO Ingot Iron.

1¼″ Corrugations:

28″ wide sheet will finish to 25″ over all—20 full corrugations to width of sheet—both edges down.

30″ wide sheet will finish to 27½″ over all—21½ full corrugations to width of sheet—one edge up and the other down.

The above figures are approximate, depending on thickness of sheets.

RIDGE ROLL

CORRUGATED AND PLAIN APRON

Base Price

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

CORRUGATED ROOFING AND SIDING

Stocks carried in

GALVANIZED STEEL
GALVANIZED COPPER BEARING STEEL
GALVANIZED ARMCO INGOT IRON

U. S. Std. Gauge	Size Inches	Estimated Weight Per Sheet Pounds	Sheets Per Bundle	Net Extra For Size
26	x 27½ x 72	13.59	11	+.50
	27½ x 84	15.86	10	+.50
	27½ x 96	18.12	8	+.50
	27½ x 108	20.25	7	+.50
	27½ x 120	22.66	7	+.50
	27½ x 144	27.18	6	+.60
24	x 27½ x 72	17.34	9	+.25
	27½ x 84	20.23	7	+.25
	27½ x 96	23.12	7	+.25
	27½ x 108	25.88	6	+.25
	27½ x 120	28.91	5	+.25
	27½ x 144	34.68	4	+.35
22	x 27½ x 72	21.09	7	+.20
	27½ x 84	24.61	6	+.20
	27½ x 96	28.12	5	+.20
	27½ x 108	31.50	5	+.20
	27½ x 120	35.16	4	+.20
	27½ x 144	42.18	4	+.30
20	x 27½ x 72	24.84	6	+.15
	27½ x 84	28.98	5	+.15
	27½ x 96	33.12	5	+.15
	27½ x 108	37.11	4	+.15
	27½ x 120	41.41	4	+.15
	27½ x 144	49.68	3	+.25

Sizes listed above can be furnished immediately from stock in 2½ in. and 1¼ in. standard corrugations.

NUMBER OF SQUARE FEET IN ONE SHEET

Length of Sheets Inches	26 Inches Wide	27½ Inches Wide
60	10.83	11.458
72	13.00	13.75
84	15.167	16.042
96	17.333	18.333
108	19.50	20.624
120	21.6661	22.916
132	23.833	25.208
144	26.00	27.50

U. S. Standard Gauge

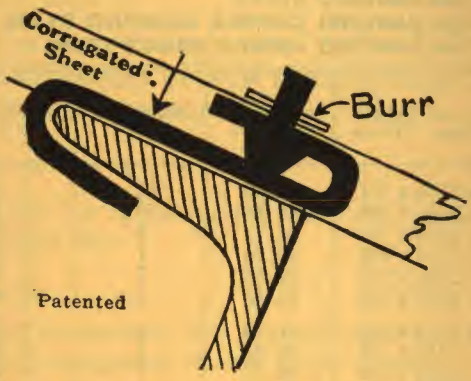
ESTIMATED WEIGHT PER SQUARE (100 SQ. FT.)

Gauge No.	26 Inches Wide	27½ Inches Wide	Gauge No.	26 Inches Wide	27½ Inches Wide
16	286 lbs.	290 lbs.	24	125 lbs.	126 lbs.
18	232 lbs.	235 lbs.	26	98 lbs.	99 lbs.
20	178 lbs.	181 lbs.	27	91 lbs.	92 lbs.
22	151 lbs.	153 lbs.	28	84 lbs.	85 lbs.

Page No.
Corr. Galv. Steel 79
Copper Bearing 79
Armco Ingot Iron 79
Pfeifer Clips 80
Surgrip Nails 80

PFEIFER CLIPS

Base Price



The Pfeifer Clip is a new clip for fastening corrugated sheets to structural steel.

Clips are made of No. 12 x 5/8" steel, with soft iron rivet attached and galvanized after forming.

SURGRIP

LEAD HEADED ROOFING NAILS

Base Price

"Surgrip" Lead Headed Nails require no lead washer such as is necessary in other methods of applying corrugated or flat galvanized sheets. Lead Heads hammer down tight over the surface of the sheet because "Surgrip" Nails are a Unit combining both nail and washer. Application is more rapid and joints are tighter and more likely to be watertight.

Made of No. 10 Deformed Wire, corresponding to Standard Roofing Nails.

Standard lengths 1½ inches and 2 inches.

Sold in keg lots of 100 lbs. or in smaller quantities to supply any size roofing job.

We estimate that it requires 21 lbs. of nails to lay 100 square feet of roofing.

CORRUGATED ROOFING AND SIDING SEE PAGES 78-79

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO WELDING WIRES AND ACCESSORIES

Electrodes and Gas Rods

Steel
Cast Iron
Stainless
Heat Resisting
Non-Ferrous
Hard Surfacing
Graphite and Carbons

Accessories

Helmets
Goggles
Cover Glasses
Cable
Gloves
Aprons
Clothing
Shields
Lenses
Holders
Connectors
Spats
Fluxes

POTTSCO ELECTRODES

N.E.M.A. Standard	Pottsco No.	Approx. Brinell of Weld Metal	Chemical Analysis C	Mn	P	S	Si	Ni
A Bare Electrodes	1	119	.012	.018	.004	.023	.003	
	3	125	.06 Max.	.15	.04	.04	.04	
	23	143	.13-.18	.40-.60	.04	.04	.04	
	25	145	.13-.18	.40-.60	.04	.04	.04	
B Thinly Coated Electrodes	33	125	.13-.18	.40-.60	.04	.04	.04	
	35	125	.13-.18	.40-.60	.04	.04	.04	
	37	114	.012	.018	.004	.023	.003	
	39	140	.13-.18	.018	.04	.04	.04	
C Heavily Coated Electrodes	5	140	Shielded-Arc Electrodes—Elements in heavy flux coating determine composition of weld metal.					
	7	155						
	107	150						
D High Tensile Electrodes	29	307	.85-1.10	.30-.60	.04	.04		
	67	143	.30- .40	.60-.90	.04	.04		
	69	163	.45- .55	.60-.90	.04	.04		
	79		.10- .20	.30-.60	.04	.05		3.25-3.75
	107	150	(See N.E.M.A. "C" above)					
E Hard Surfacing Electrodes	11	170	.85-1.10	.30-.60	.04	.04		
	15	497	See Page 95					
	43	182	.85-1.10	.30-.60	.04	.04		
	47	180	.80	13.00			.75	3.00
	49	592	See Page 96					
	57	180	.80	13.00			.75	3.00
	81	614						
	83	545	**"Wall-Colmonoy Corp. Alloys and Overlay Metals":** Under this heading, page 98.					
	85	627						
	87	550						
F Ferrous Electrodes for Welding Cast Iron	1	119	.06 Max.	.15	.04	.04	.04	
	37	114	.06 Max.	.15	.04	.04	.04	
	45	115	.06 Max.	.15	.04	.04	.04	
	See POTTSCO No. 89 for machinable welds in cast iron.							

				C	Cr	Mo	Ni
G Stainless and Heat	G-2	19-9	217	.07 Max.	19.00 Min.		9.00 Min.
		25-12	167	.25 Max.	25.00 Min.		12.00 Min.
		25-20	...	.25 Max.	25.00 Min.		20.00 Min.
Resisting Alloy Electrodes	G-1	4-6	444	.10 Max.	4.00 Min.	.40-.60	
		13	444	.12 Max.	12.00 Min.		
		17	444	.12 Max.	16.00 Min.		
		27	...	.35 Max.	23.00 Min.		
H Non-Ferrous Electrodes		21		Phos. Bronze			
		31		Alumin with .05 Silicon			
		89		Special Non-Ferrous Electrode for Welding Cast Iron			

			C	Mn	P	S	Ni
I Miscellaneous Electrodes	9		.45-.55	.60-.90	.04	.04	
	51		Carbon				
	53		Carbon-Graphite				
	55		Pure Graphite				
	59	158	.45-.55	.60-.90	.04	.04	
	65	140	.30-.40	.60-.90	.04	.04	
	77	160	.10-.20	.30-.60	.04	.05	3.25-3.75

Note—See National Electrical Manufacturers Association Standards.

Detailed descriptions of the grades listed above will be found on the following pages.

FOR AVAILABLE SIZES AND PACKING: PAGE 104.

A Phone Call will bring our Welding Engineer, without cost or obligation.

Page No.
Electrodes 81 to 97
Colmonoy 98
Stainless Electrodes 99
Gas Rods 100 to 102
Stainless Gas Rods 103-104
Wire & Cable 105
Accessories 106-107

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

(ELECTRODE SPECIFICATION)

STANDARD "C" HEAVILY COATED ELECTRODES

These Page Hi-Tensile (POTTSCO) Electrodes are general purpose electrodes of the Shielded-Arc type, suitable for all welding positions. High strength and good ductility are features of the weld metal. With simple technique they give high speed of deposition, exceptionally smooth bead and very low spatter loss.

Page Steel and Wire Division of the American Chain Co. Hi-Tensile "A" (POTTSCO No. 7), Hi-Tensile "C" (POTTSCO No. 5), and Hi-Tensile "F" (POTTSCO No. 107) electrodes will meet the requirements of the following regulating bodies:

A. W. S.

American Welding Society, Specifications Grades Nos. 2, 4, 10, 15, 20	Page Hi-Tensile "A," "C," "F"

A. S. M. E.

American Society of Mechanical Engineers, Specifications Class 1 and Class 2	Page Hi-Tensile "C," "F"

A. B. S.

American Bureau of Shipping, Approval H1G and B2G	Page Hi-Tensile "A," "C," "F"

U. S. Navy

United States Navy	Page Hi-Tensile "C"

U. S. Dept. of Commerce

Bureau of Marine Inspection and Navigation	Page Hi-Tensile "C"

Casualty and Surety Underwriters, Specifications Class 1 and Class 2	Page Hi-Tensile "A," "C," "F"

Codes

Structural, Bridges, Machinery and Pressure Piping	Page Hi-Tensile "A," "C," "F"

Page Hi-Tensile "A" we designate POTTSCO No. 7.

Page Hi-Tensile "C" we designate POTTSCO No. 5.

Page Hi-Tensile "F" we designate POTTSCO No. 107.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 7

(Page Hi-Tensile "A" Electrodes)

POTTSCO No. 5

(Page Hi-Tensile "C" Electrodes)

and

POTTSCO No. 107

(Page Hi-Tensile "F" Electrodes)

Shielded-Arc Type

These electrodes can be used in all positions of welding—flat, vertical and overhead. With POTTSCO SHIELDED-ARC ELECTRODES unusually high operating speeds can be maintained. In general, the speed is about twice that possible with bare or light-coated electrodes. This, together with the ease with which the operator can produce a smooth even bead, of full uniform section, means high-quality welds at low production costs.

COATING AND PROTECTION IN WELDING

The heavy covering on these electrodes is produced by extrusion and is of uniform thickness and concentricity. This heavy covering protects the arc stream and the molten metal from the oxygen and nitrogen in the air by forming a perfect envelope of reducing gases and protecting slag on the weld deposit metal back of the crater.

The type of covering on POTTSCO ELECTRODES permits bending the electrodes to a considerable angle before the coating will fracture. This is a great advantage where certain types of welds require bending the electrode. Undercutting is practically eliminated.

PROTECTION DURING COOLING

This is a critical stage in welding, and the nature of the slag-forming materials contained in the coating and the tight envelope they form appreciably slow up the rate of cooling. This slow cooling and the exclusion of oxygen and nitrogen give a dense fine grain structure, free from gas holes or inclusions. Shrinkage stresses are thus reduced and the ductility increased.

REMOVING PROTECTIVE FORMATION

The complete slag formation on the weld metal, after cooling, requires the minimum effort for removal. Usually by tapping the parent metal adjacent to the weld metal the slag covering comes off intact for part or all the length of the bead.

BRASS
COPPER
BOILER
TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL
STEELS
DRILL RODS
STAINLESS
AND
T RESISTING
STEELS
INDEX
chnical Data
GAUGES AND
WEIGHTS
Extras for
Size and
Quantity
CUTTING
EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

"POTTSCO"

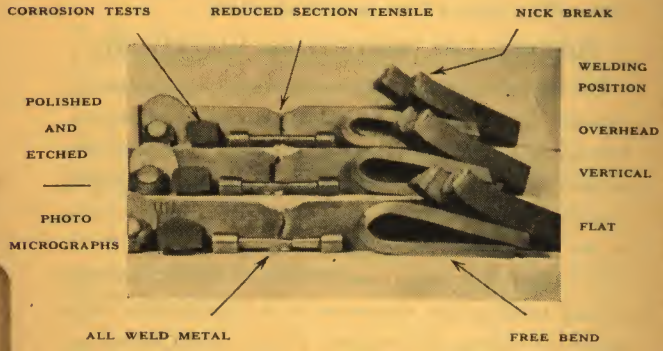
PHYSICAL DATA OF WELD METAL

	POTTSCO No. 5	*POTTSCO No. 107*
Tensile Strength	65/75,000 PSI	75/83,000 PSI
Yield Point	50/60,000 PSI	60/67,000 PSI
Elongation in 2 Inches	20/30%	20/25%
Specific Gravity	7.85	7.83
Impact Strength (Izod)	35/70 ft. lb.	27/52 ft. lb.
Fatigue Strength	27/32,000 PSI	26/31,000 PSI

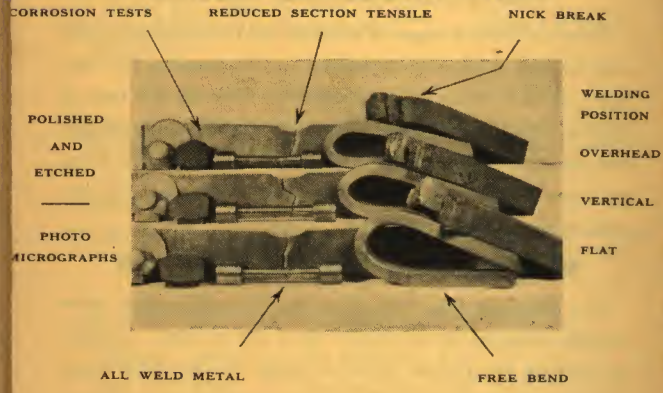
Physical Data of Welded Specimens
(As Welded)

	POTTSCO No. 5	*POTTSCO No. 107*
Tensile Strength	70/79,000 PSI	70/81,000 PSI
Free Bend	30/60%	20/30%
Nick Break	Fractures show long silky fibre free from gas pockets and slag inclusions.	
Corrosion Resistance	All POTTSCO Shielded - Arc Coated Electrodes show remarkable resistance in a 50% hydrochloric acid test.	

POTTSCO No. 5
(PAGE HI-TENSILE "C" ELECTRODES)



POTTSCO No. 107
(Page Hi-Tensile "F" Electrodes)



FOR AVAILABLE SIZES, QUANTITIES AND PACKING: PAGE 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO NO. 7

(Page Hi-Tensile "A" Electrodes)

POTTSCO NO. 5

(Page Hi-Tensile "C" Electrodes)

and

POTTSCO NO. 107

(Page Hi-Tensile "F" Electrodes)

USES

POTTSCO SHIELDED-ARC ELECTRODES are useful for many classes of welding, such as:

High Pressure Tanks	Structural
Boilers	Refrigerators
Machine Bases	Pipe Lines
Machine Frames	Automobile Parts
Tractor Frames	Conveyors
Concrete Mixers	Fuel Tanks
Ornamental Iron	Smoke Stacks
Ships	Air Conditioning Parts

The smaller diameters are well suited for welding light gauge materials, therefore a special grade for light gauge welding is not necessary.

CONVENIENTLY PACKED

POTTSCO Electrodes and Gas Rods are shipped in sturdy packages for your convenience. These handy cartons make for easy storage and handling, and reduce waste.

APPROX. NUMBER OF 14" ELECTRODES IN ONE LB.

Size Inches	POTTSCO No. 5	Size Inches	POTTSCO No. 107
3/32	38.0 (12" Lengths)	3/32	38.0 (12" Lengths)
1/8	18.5	1/8	18.5
5/32	12.2	5/32	11.5
3/16	8.2	3/16	8.0
1/4	4.6	1/4	4.5
5/16	3.0	5/16	3.0
3/8	2.0	3/8	2.0

BRASS
COPPER
BOILER
TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
ARBON & ALLOY
TEELS
TOOL
STEELS
DRILL RODS
TAINLESS
AND
T RESISTING
STEELS
INDEX
hnical Data
AUGES AND
WEIGHTS
Extras for
Size and
Quantity
CUTTING
EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO NO. 7

(Page Hi-Tensile "A" Electrodes)

POTTSCO NO. 5

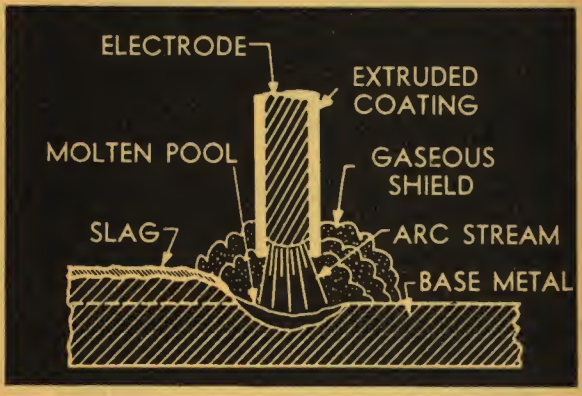
(Page Hi-Tensile "C" Electrodes)

POTTSCO NO. 107

(Page Hi-Tensile "F" Electrodes)

TECHNIQUE OF WELDING

Every welder is familiar with the fact that air in contact with hot weld metal seriously affects the weld. Air contains oxygen and nitrogen and with ordinary methods and uncoated welding rods there is nothing to counteract the effect of these two gases on the hot weld metal. The two cuts on this page illustrate protected and non-protected welding. Research has shown that if the molten weld metal is protected from the air while being deposited, the injurious effects of these gases are eliminated.



POTTSCO No. 107 Electrodes absolutely afford the necessary protection for a superior weld. POTTSCO No. 107 Electrodes have three main features:

1. The coating burns slower than the metal electrode, thus forming a projection which shields the heated end of the electrode metal.
2. The burning of the coating forms a gas which surrounds the molten weld metal and excludes all atmosphere.
3. A protective slag coating forms over the deposited metal and excludes the oxygen while the weld is cooling and also retards the rate of cooling.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 107

(PAGE HI-TENSILE "F" ELECTRODES)

Recommended Current (Amperes) Values and Arc Voltages

Electrode Diameters	Flat	Vertical Down	Vertical Up	Overhead	Arc Voltage
3/32"	25–90	.....	.....	.....	18
1/8"	55–140	60–150	50–135	50–130	|
5/32"	90–200	100–215	60–175	60–170	|
3/16"	120–275	130–285	90–250	90–240	to
1/4"	175–500	.....	.....	.....	|
5/16"	240–625	.....	.....	.....	|
3/8"	300–650	.....	.....	.....	32

FEATURES

SERVICES

POTTSCO No. 107 is a mild steel general purpose electrode of the shielded-arc type, producing welds of exceptionally high strength and ductility. Especially recommended for high speed single pass welding.

THREE POSITION

POTTSCO No. 107 Electrodes are suitable for use in flat, vertical or overhead welding. See pages 87-91 for operating instructions.

SPEED

The shielded-arc type of welding requires much higher voltage and amperage than for the unshielded-arc but the resulting increase in heat makes it possible to weld much faster. There is an exceptionally smooth bead and very low spatter loss.

QUALITY

The weld metal in welds made with POTTSCO No. 107 Electrodes has tensile strength, elongation, density, fatigue and impact resistance equal or better than mild steel. See figures on page 84.

COATING

POTTSCO No. 107 Electrodes have a heavy flux coating which is of uniform thickness and composition. This coating will not crack nor spall off from ordinary handling.

Welding High Pressure Pipe Line with POTTSCO No. 107 Electrodes

For Available Sizes, Quantities and Packing: Page 104.

BRASS
COPPER
BOILER
TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
CARBON & ALLOY
STEELS
TOOL
STEELS
DRILL RODS
STAINLESS
AND
T RESISTING
STEELS
NDEX
hnical Data
AUGES AND
WEIGHTS
Extras for
Size and
Quantity
CUTTING
EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 107

(Page Hi-Tensile "F" Electrodes)

GENERAL OPERATING INSTRUCTIONS

POLARITY

POTTSCO No. 107 ELECTRODES should be used with regular polarity, that is, the electrode connection negative and the work connection positive.

LENGTH OF ARC

Use a short arc about the same as used when welding with a bare electrode. However, the arc length should never be so short that the coating touches the molten pool as this would tend to cause a porous weld.

ELIMINATING CRATERS

At the completion of the weld or when changing electrodes, craters can be eliminated by withdrawing the electrode slowly at right angles until the arc is broken.

METHOD OF STARTING

When starting another electrode, strike the arc slightly ahead of the crater, hesitate for a moment, then move backwards to completely remelt and fill the crater. Proceed as usual.

WEAVING

When weaving is specified use the motions indicated in the diagram below. Stop for a moment at sides of scarf.

(Continued on pages 89-91)

For Available Sizes, Quantities and Packing: Page 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 107

(Page Hi-Tensile "F" Electrodes)

GENERAL OPERATING INSTRUCTIONS

(Continued)

PREVENTING UNDERCUTTING

Undercutting can be prevented by watching the solidifying metal and advancing the arc at a rate which will fill up all of the undercut. Do not advance the arc too rapidly.

COATING ON DEPOSITED METAL

POTTSCO No. 107 ELECTRODES form a slag coating on the deposited metal. This coating protects the deposited metal from the air until it cools, and also retards the rate of cooling, thus providing a beneficial annealing effect. It can be removed quite easily after it cools with any blunt tool and wire brush. This should be done (especially along the edges of the weld) before proceeding with a new bead.

ARC BLOW

Arc blow will cause an uneven burning of the coating and result in improper fusion and gouging in the side walls. When present, arc blow can be frequently compensated for by shifting the ground connection to a different part of the work.

FITTING UP

It is always worth while to take the time necessary to secure a proper alignment of the parts that are being welded. It will pay in better welds and greater welding speed.

HEAT DISSIPATION

Always direct the arc in such a manner that both plates are heated equally, especially when welding plates of unequal thickness.

SET UP

Work should be arranged so that the molten pool will be as near horizontal as possible. This can usually be accomplished by tilting the work at a slight angle. Increased welding speeds will result.

ALLOW WELD TO COOL

Welds should be allowed to cool between beads. On heavy plates and long seams the weld will usually cool sufficiently as the operator proceeds, before the next bead is applied, but sometimes in short heavy sections this will not happen and additional time must be allowed. The cooling will also make it easier to remove the slag coating.

(Continued on pages 90-91.)

For Available Sizes, Quantities and Packing: Page 104.

BRASS
COPPER
BOILER
TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
CARBON & ALLOY
STEELS
TOOL
STEELS
DRILL RODS
STAINLESS
AND
T RESISTING
STEELS
NDEX
hnical Data
AUGES AND
WEIGHTS
Extras for
Size and
Quantity
CUTTING
EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 107

(Page Hi-Tensile "F" Electrodes)

GENERAL OPERATING INSTRUCTIONS

(Continued)

WELDING BUTT SEAMS

Either narrow or wide beads may be deposited without undercutting at the sides of the bead by holding a rather short arc, i.e., with the coating just out of contact with the molten crater. The electrode should be inclined about 20° in the direction of travel.

A light but complete slag covering is left on the bead but the crater is free from slag, making it easy to resume operation after any interruption to the arc.

In multiple bead welding the slag must be removed thoroughly by scaling with a chisel or other pointed tool before the next layer is applied. The slag is removed easily when cool. Failure to observe this precaution may result in porosity.

It is advisable not to apply the second layer until the first is cool to the hand.

FILLET WELDS

Use current values shown in table (page 87). Incline the electrode at an angle of about 45° with the horizontal member. A short arc should be maintained and the electrode advanced in a steady, straight line without weaving or retracing. This will produce a bead of uniform section with full throat and equal areas of fused contact on both vertical and horizontal members.

LAP WELDS

The procedure is the same as for fillet welds.

VERTICAL WELDS

(Welding Down)

In vee or fillet welds use 5/32" or 3/16" electrodes at currents shown in table (page 87). The arc length should be somewhat greater than for flat welding. The electrode should be inclined upward at an angle of about 15° and should be advanced in a straight line without weaving. Multiple beads may be applied as needed to produce the section of weld desired.

Slag may be removed by scaling but in vertical down welding it is often possible to melt away the slag by the application of the second layer. In this case, the arc should be held stationary for a few seconds to clean the crater after which the electrode should be advanced. The operator should see that all slag is melted away well ahead of the crater. When welding is interrupted, slag accumulations should be removed by scaling. In this method a fairly high value of welding current should be used.

VERTICAL WELDS

(Welding Up)

Welding up is required in certain applications, notably by the U. S. Navy, and while greater skill is required from the operator in general, strong, dependable welds will be produced. The slag must be removed carefully by scaling and each bead should be allowed to cool before the second layer is applied. Light peening of each bead will aid materially in removing residual stresses.

The currents recommended in table (page 87) are considerably lower than for flat or down vertical welding. In general, 5/32" to 3/16"-diameter electrodes should be used. The electrode should be held at nearly right angles to the work and advanced in a straight line without weaving or retracing.

(Continued on page 91.)

For Available Sizes, Quantities and Packing: Page 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 107

(Page Hi-Tensile "F" Electrodes)

GENERAL OPERATING INSTRUCTIONS

(Continued)

VERTICAL WELDS

(Butt Seams)

Welds of this type should be made "welding up" with 5/32"-3/16" lectrodes with currents shown in table (page 87). The width f the bead and depth of the throat should be regulated to meet he requirements of the work.

OVERHEAD WELDS

These welds should be applied in numerous light beads using /8"-5/32" and 3/16" electrodes at current values shown in table ith a short arc. Slag should be removed carefully by scaling and eads allowed to cool before the additional layers are applied.

Note—In the use of the POTTSCO No. 107 ELECTRODES, he tendency for undercutting at the sides of the seam and spatter ss will be reduced to a minimum. The efficiency of the electrode in oth of these respects depends to a considerable extent on the aintenance of the correct length of arc and on the amount of elding current used. Operators should check these points arefully.

POTTSCO No. 107 Electrodes used to fabricate a sturdy mine car at minimum expense

POTTSCO No. 7

(Page Hi-Tensile "A" Electrodes)

FLAT, VERTICAL and OVERHEAD POSITIONS
Recommended Current (Amperes) Values and Arc Voltages.

lectrode iameters	Flat	Vertical Down	Vertical Up	Overhead	Arc Voltage
3/32"	60- 80	.....	.....	.....	20
1/8"	80-120	90-130	70-100	80-120	|
5/32"	120-160	140-170	90-130	100-140	|
3/16"	150-200	160-210	120-160	130-170	to
1/4"	200-275	.....	.....	.....	|
5/16"	275-350	.....	.....	.....	|
3/8"	350-400	.....	.....	.....	25

Straight (Electrode Negative) or Reverse (Electrode Positive) olarity can be used but Reverse Polarity is recommended.

For Available Sizes, Quantities and Packing: Page 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 5

(Page Hi-Tensile "C" Electrodes)

TECHNIQUE OF WELDING

Suitable for welding in flat, vertical and overhead positions. When used in accordance with the following general instructions, they will produce weld metal of high tensile strength and high ductility.

Polarity—Reversed only. (Electrode positive.)

WELDING CURRENTS

(Amperes)

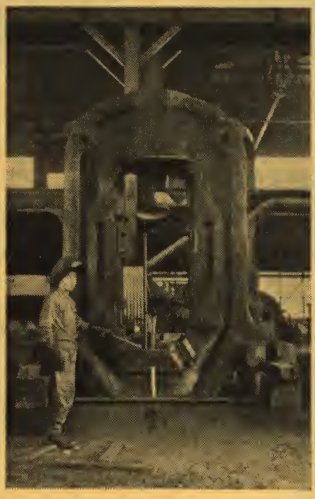
Electrode Diameter	Horizontal	Vertical	Overhead
1/4"	175-500	Not Recommended	
3/16"	140-350	125-180	125-180
5/32"	90-200	110-160	110-160
1/8"	75-150	75-140	75-140
3/32"	25- 95	25- 85	25- 85

Arc Voltage (All diameters) . . . . . Horizontal—30 minimum.
Vertical —25 minimum.
Overhead —25 minimum.

Flat Welding: Watch arc voltage. Be sure it is not less than 30 volts. Use currents in approximately middle of above ranges and maintain an arc length *of not less than* 1/8".

Vertical and Overhead Welding: Do not use an electrode larger than 3/16" diameter. If joints are tight use 1/8" diameter. For normal openings on ordinary work 5/32" diameter is recommended. Be sure arc voltage is not less than *25 volts*. When welding in overhead position do not weave a wide bead. Build up the weld with several narrow beads. Clean each bead before applying the next.

For Additional Procedure: Follow that shown on pages 90-91 under heading of Welding Butt Seams, Fillet Welds, Lap Welds, Vertical Welds and Overhead Welds.



A heavy rolling mill frame repaired like new at a large saving with POTTSCO No. 5 ELECTRODES

For Available Sizes, Quantities and Packing: Page 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 1
(Page Armco Electrodes)

POTTSCO No. 1 Electrodes are made from ARMCO Ingot Iron (Guaranteed 99.84% pure *iron* by analysis). These electrodes are outstanding in the soundness so essential in a welding material.

The weld deposit metal has a tensile strength of approximately 45,000 lbs. per sq. in. with greater ductility than that given by bare steel electrodes.

Used for welding low carbon steel forgings, tanks, boilers (low-pressure), castings, strength welds on cast iron. Fuses well with galvanized stock, Armco plate, Toncan plate, and alloy steels.

Recommend straight polarity, that is, electrode negative and ground positive.

POTTSCO No. 3
(Page "CE" Electrodes)

A bare low carbon steel electrode, with approximately 50,000 lbs. per sq. in. tensile strength in the deposited metal.

Used for welding low carbon steel forgings, structural shapes, tanks, boilers (low-pressure), bars and castings.

Will meet the requirements where POTTSCO No. 25 is too high and POTTSCO No. 1 too low in carbon content.

Recommend straight polarity.

POTTSCO No. 23
(Page "E" Electrodes)

This is a good all around bare steel electrode.

Used for the same purposes as POTTSCO No. 25 but is not processed.

Recommend straight polarity.

POTTSCO No. 25
(Page "B" Electrodes)

Best all around bare steel electrode for welding in flat, vertical and overhead positions.

Used for structural shapes, plates, boilers (low-pressure), tanks, fire boxes, flues, mild steel parts and low carbon steel forgings and castings.

This is a processed electrode.

Recommend straight polarity.

POTTSCO No. 9
(Page .50 Carbon Bare Electrodes)

A bare steel electrode similar to POTTSCO No. 23 but of higher carbon to produce a harder and more wear resisting deposit.

Used for welding forgings, steel wearing parts such as crank pins, shafts, axles, etc.

Use straight or reverse polarity.

POTTSCO No. 59
(Page .50 Carbon Flux Coated Electrodes)

A light flux coated electrode of medium carbon content.

Used for welding crank pins and other parts subjected to abrasion where severe shocks are not encountered.

Recommend reverse polarity.

POTTSCO No. 65
(Page .35 Carbon Flux Coated Electrodes)

A light flux coated electrode of .35% carbon content.

Used for the same purposes as POTTSCO No. 59 where parts welded are of slightly lower carbon content.

Use straight or reverse polarity.

For Available Sizes, Quantities and Packing: Page 104.

BRASS
COPPER
BOILER
TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
CARBON & ALLOY
STEELS
TOOL
STEELS
DRILL RODS
STAINLESS
AND
AT RESISTING
STEELS
INDEX
chnical Data
GAUGES AND
WEIGHTS
Extras for
Size and
Quantity
CUTTING
EXTRAS

POTTSCO No. 69

(Page .50 Carbon Shielded-Arc Electrodes)

A medium carbon steel electrode for welding where greater strength and wear resistance are required than found in POTTSCO No. 5, at the highest possible ductility consistent with this strength. Recommend reverse polarity.

POTTSCO No. 67

(Page .35 Carbon Shielded-Arc Electrodes)

A shielded-arc steel electrode for welding .30 to .40 carbon steel. Similar to POTTSCO No. 69.
Use straight or reverse polarity

POTTSCO No. 33

(Page Special Coated "B" Electrodes)

Knurled electrode with a special dust coating which gives more stability to the arc than found in a *bare wire* arc. A fast flowing electrode.

Same uses as POTTSCO No. 25: Page 93.

Recommend straight polarity.

POTTSCO No. 35

(Page Auto Electrode)

A knurled electrode with a special dust coating.

Used for high speed welding with automatic arc welding equipment.

This is a faster electrode than either POTTSCO No. 25, page 93, or POTTSCO No. 1, page 93, for automatic or semi-automatic arc welding.
Recommend straight polarity.

POTTSCO No. 37

(Page Flux Coated Armco Electrodes)

A light flux coated (dipped) *pure ingot iron* electrode whose coating functions the same as that on POTTSCO No. 39 with the deposited metal of the same pure, close grained structure as that of POTTSCO No. 1, page 93. This metal shows practically none of the minute blow holes commonly seen in general purpose *steel* electrode deposited metal. The structure closely resembles that of the shielded-arc deposit.

Used for the same purposes as POTTSCO No. 1.

Recommend straight polarity

POTTSCO No. 39

(Page Flux Coated "B" Electrodes)

A light flux coated (dipped) electrode for general steel welding in all positions with A.C. or D.C. welding equipment.

Same uses as POTTSCO No. 33.

Gives a fast and more stable arc and greater pounds of metal deposited due to less splatter.
Recommend straight polarity.

POTTSCO No. 29

(Page Shielded-Arc High Carbon Electrodes)

An electrode with all the good points of POTTSCO No. 107 except that the ductility is decreased due to the carbon content, 85/1.10%. The tensile strength of weld is considerably increased because of the high carbon.

The core material of this electrode is the same as POTTSCO No. 11 Electrode, page 95, which will show in the deposit metal approximately Brinell hardness No. 170 when deposited on mild steel plate. In the SHIELDED-ARC POTTSCO No. 29 this hardness is increased to approximately Brinell No. 311, because of the effect of the heavy coating on this SHIELDED-ARC POTTSCO No. 29 Electrode. Used for hard surfacing and for high carbon steel that requires heat treating after welding.

Recommend reverse polarity.

For Available Sizes, Quantities and Packing: Page 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 11

(Page High Carbon Electrodes)

This is a bare steel electrode.

Used for building up steel parts that are subjected to abrasive wear such as frogs, switches, crossings, rail ends, tire flanges, conveyor buckets, etc.

Recommend reverse polarity.

POTTSCO No. 15
"CASTALOY" ELECTRODES

A hard surfacing electrode manufactured especially for Horace T. Potts Co. It is an iron base alloy. The weld deposit is air hardening and can be applied only by the electric arc process—either the metallic arc or the carbon arc method. It does not possess great hardness at high temperatures—see COLMONOY No. 3, page 98, for this quality. Over a period of years it has given excellent results on mining equipment for crushing rock, ores, etc. It is used extensively in the cement industry for all wearing parts—grinding rings, plows, rolls, conveyor flights, hammers, crusher rolls, gudgeons, bucket lips, drag link chains, etc. Other applications are: pug mill paddles, wet ash-pump casings, and impellers. Used as an outside layer over the manganese deposit, after building up worn manganese dipper teeth, POTTSCO No. 15 gives additional wear; but its main function is the protection of the built-up manganese deposit until it receives the cold working necessary to improve its wearing qualities.

WELDING TECHNIQUE

POTTSCO No. 15 requires reverse polarity and the arc characteristics are similar to those of all non-ferrous electrodes. The recommended current (amperes) and arc voltage are about the same as for a mild steel electrode for general purpose welding. Like all other high Brinell deposits, it is inadvisable to build up a thick overlay, as high hardness is almost always associated with brittleness. Where the equipment requires a large build-up use either POTTSCO No. 45, page 97, or POTTSCO No. 29, page 94, according to the impact the piece of equipment receives, and then finish off with one or two layers of POTTSCO No. 15 for abrasion resistance.

BRINELL HARDNESS—The hardness number of the deposit metal has shown as high as 650, the average being 500.

POTTSCO No. 15 is an outstanding hard surfacing electrode that will meet average abrasion resistance requirements and at a cost but slightly higher than a good general purpose mild steel electrode.

POTTSCO No. 43

(Page Flux Coated High Carbon Electrodes)

Light flux coated (dipped) electrode having same use as bare POTTSCO No. 11 but with greatly improved arc stability. It gives a non-porous deposit due to the protection from the coating. Welds made with bare electrodes with carbon content above .70% tend to be porous due to the violent reaction to the atmosphere and the high carbon content in a high temperature arc, which liberates carbon gases in deposited metal, leaving a honey-comb surface in the weld metal. The flux coating eliminates this and has the additional advantages as set forth under POTTSCO No. 39, page 94.

Used for the same purposes as POTTSCO No. 11.

Recommend reverse polarity.

For Available Sizes, Quantities and Packing: Page 104.

POTTSCO No. 47

(Stulz-Sickles Co.—Bare Manganal Electrodes)

These electrodes are manufactured by a special process which results in a weld deposit metal that is tough and hard, and free from checking.

POTTSCO No. 47 ELECTRODES give high tensile strength and ductility. By hardening under impact, abrasion resistance equal to the parent metal is secured.

Welding heat tends to impair the useful qualities of Manganese Steel, but in POTTSCO No. 47 ELECTRODES the low carbon and 3% Nickel content help to correct the brittleness in the adjacent parent metal and give toughness in the weld deposit.

Quenching is not necessary, but peening, if done while weld metal is hot, will give improved results, taking care of contraction and building up surface hardness. (Peen thoroughly but not excessively.)

This electrode is furnished either bare or flux coated.

Applications:

Used for building up high manganese steel parts such as bucket lips, dipper teeth, grinding rolls, and railway track work such as frogs, switches, crossovers, etc. The most satisfactory rod for reclaiming worn manganese steel castings, and equally effective in prolonging the life of cast or rolled carbon and alloy steel parts by application at the points subject to wear.

Use about the same amperage as used on steel electrodes of this size.

Recommend reverse polarity.

POTTSCO No. 57

(Stulz-Sickles Co.—Light Flux Coated Manganal Electrodes)

A (dipped) Electrode for same general purposes as POTTSCO No. 47 for use with either A.C. or D.C. welding equipment.

POTTSCO MANGANAL FORGED WEDGES

A 13% Manganese, 3% Nickel wedge specially designed to quickly and economically replace by "welding-on" the worn teeth of shovels and dippers. Always use POTTSCO MANGANAL ELECTRODES for such welding.

POTTSCO MANGANAL TRACTOR TREAD GROUSER BAR

A High Manganese, 3% Nickel Bar specially shaped for this use. Use POTTSCO MANGANAL ELECTRODES for welding.

POTTSCO MANGANAL APPLICATOR (FILLER) BARS

A 13% Manganese, 3% Nickel, supplied in squares, flats, rounds and special shapes for welding onto worn-down manganese and carbon steel surfaces. Use POTTSCO No. 47 ELECTRODES in welding applicators.

For Available Sizes, Quantities and Packing: Page 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 51

(Carbon Electrodes)

A CARBON ELECTRODE having a low ampere carrying capacity and extreme hardness. They will hold to desired tapers and will not spindle unevenly, assuring exceptionally long life. Recommended for normal amperage.

POTTSCO No. 53

(Carbon-Graphite Electrodes)

CARBON-GRAPHITE ELECTRODES are a combination of high grade carbon and graphite which produces an electrode softer than pure carbon but having a higher ampere-carrying capacity. Recommended for intermittent service on high amperage, especially for cutting.

POTTSCO No. 55

(Pure Graphite Electrodes)

PURE GRAPHITE ELECTRODES are fully graphitized in an electric furnace. They are unexcelled where high amperages and resultant high temperatures are required and will operate efficiently in continuous service. They give much longer life under severe operating conditions than the CARBON ELECTRODES or CARBON-GRAPHITE ELECTRODES.

Use straight polarity.

POTTSCO No. 31

(Aluminum—5% Silicon Electrodes)

A shielded-arc type electrode. Used for metallic arc welding of cast and sheet aluminum.

Recommend reverse polarity.

POTTSCO No. 45

(Page Shielded-Arc Armco Electrodes)

One of the best electrodes for making strength welds in cast iron. May be used for welding steel and has the advantages of POTTSCO No. 7 ELECTRODE with somewhat greater ductility, but with lower tensile strength because of its low carbon content, .012%.

Recommend reverse polarity, but straight polarity may be used.

POTTSCO No. 49

(Page Hard Facing Welding Rod)

WHAT THEY ARE

POTTSCO No. 49 HARD FACING WELDING RODS consist of a balanced composition of nickel, chromium, tungsten, molybdenum and tungsten carbide.

May be used with either oxy-acetylene torch, electric arc or atomic arc welding processes for hard facing all grades of steel, gray iron or malleable iron.

PENETRATION

Any welding method will produce a perfect bond of deep penetration and the hard surface will not spall off.

TOUGHNESS

The hard facing produced by these rods has great shock-resisting properties.

ABRASION RESISTANCE

This unusual combination of toughness and hardness is due to the locking of tungsten carbide particles in the matrix of the alloy. At temperatures from 1150 degrees F. up to 1500 degrees F. welds made with this rod retain their resistance to wear.

For Available Sizes, Quantities and Packing: Page 104.

BRASS
COPPER
BOILER
TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
CARBON & ALLOY
TEELS
TOOL
STEELS
DRILL RODS
STAINLESS
AND
AT RESISTING
STEELS
INDEX
chnical Data
GAUGES AND
WEIGHTS
ELASTUF
Extras for
Size and
Quantity
CUTTING
EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

COLMONOY ALLOYS AND OVERLAY METALS

COLMONOY products contain certain heretofore unknown metallic crystals. These crystals are insoluble in hot or cold acid or alkali solutions, do not oxidize even at high temperatures, have a hardness of approximately 9 on Moh's scale and retain their identity when they come in contact with fused metals.

COLMONOY crystals may be applied or sweat-on with the flame of the oxy-acetylene torch or the carbon electric arc, and may be applied to the vertical as well as the horizontal plane, or overhead. Furnace heat may be used where feasible. They may be made to follow any contour or shape and may be applied in a continuous layer or in spots or well defined areas. Regardless of the method or type of application, the more common metallic boride crystals alloy with the skin or outer surface of the parent metal to form a matrix for the COLMONOY crystals which do not fuse or unite with each other, so that the parent metal, although well protected, is free to expand or contract or change its form by forming or forging without disturbing the overlay.

SWEAT-ON

Crystals shipped in 1 lb. and 5 lb. containers.

Paste furnished in 1 lb. triple sealed top tin cans or in small size tubes.

COLMONOY WELDING RODS AND ELECTRODES

By mixing various quantities of COLMONOY crystals with certain base metals and alloys, welding rods and electrodes have been prepared, which can be used with ferrous metals in the usual ways to form wear-resistant, welded-on overlays or hard facings. These rods are designated by number, each designed for a specific use or class of uses, and will be found very easy to apply with either the oxy-acetylene torch or the metallic electric arc, resulting in a solid, efficient overlay that is well amalgamated with the parent metal.

COLMONOY No. 1

A high carbon steel core material with a flux coating made up of COLMONOY crystals, particularly adapted to building up relatively large sections or thick overlays. Results in hard, tough deposits of 60 or more Rockwell C with considerable inherent strength. For gas or electric arc (reverse polarity) application.

COLMONOY No. 2

A cast rod forming a very efficient wear-resistant surface on ferrous metals at a relatively low cost. Give a quite hard (58 Rockwell C) deposit suitable for average requirements not subjected to severe shock or pounding.

COLMONOY No. 3

A cast rod showing resistance to shock and abrasion and possessing considerable red hardness. Rockwell C approx. 64.

COLMONOY No. 6

Forms a deposit having a Rockwell C hardness of 58 to 60 which is highly resistant to sulphuric acid as well as exceptionally resistant to abrasion. Grinds to a smooth polished surface and also wears smooth in service. For gas and electric arc application.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO STAINLESS AND HEAT RESISTING ALLOY STEEL ELECTRODES

(Page-Allegheny)

A shielded-arc type electrode for welding stainless steel. The heavy covering on these electrodes is produced by extrusion and is uniform throughout their entire length and kept at a definite micrometer thickness for each size. This assures the same free flowing and quiet arc characteristics in every electrode. It also forms a perfect slag covering of uniform thickness over the deposited metal. This protection is of the utmost importance in the welding of stainless steel. It requires the minimum amount of labor for the removal of this slag. The composition of core material or rod is of the low carbon range with the proper percentage of chromium or chromium and nickel to guarantee the maximum non-corrosive qualities in the weld deposit.

Recommend reverse polarity.

POTTSCO STAINLESS STEEL ELECTRODES can be supplied in all standard analyses. The following paragraphs describe the grade generally used.

POTTSCO 19-9 S STAINLESS AND HEAT RESISTING ALLOY STEEL ELECTRODES

(Page-Allegheny)

TYPE 306

Sizes for Immediate Shipment

Diameter Inches	1/16	3/32	1/8	5/32	3/16	1/4
Length	15″	15″	15″	15″	15″	15″
Standard Package Pounds	10 and 25	10 and 25	10 and 25	10 and 25	10 and 25	10 and 25

This type is used perhaps more than any other electrode for welding on Stainless Steel. It is a corrosion-resistant steel for the widest range of applications. It makes a weld which is resistant to atmospheric or other moisture, salt water, milk, foodstuffs and most organic or inorganic chemicals; and one that will machine readily and take a high polish.

This electrode contains approximately 19% Chromium and 9% Nickel, with a *very low Carbon content*. Heat treatment after welding is not always necessary, and where it is employed, does not harden the weld metal.

POTTSCO 19-9 S can also be furnished with TITANIUM or COLUMBIUM or with 2/4% MOLYBDENUM.

POTTSCO STAINLESS AND HEAT RESISTING ALLOY STEEL ELECTRODES

AVAILABLE FOR PROMPT SHIPMENT

POTTSCO 19-9 S—Cr Ni
POTTSCO 25-12—Cr Ni
POTTSCO 25-20—Cr Ni
POTTSCO 18-8 S MO—Cr Ni
POTTSCO 15-35—Ni Cr
POTTSCO 19-10 Cb.—Cr Ni Stab.
POTTSCO 13—Chrome
POTTSCO 17—Chrome
POTTSCO 27—Chrome
POTTSCO 4-6—Chrome

For Available Sizes, Quantities and Packing: Page 104.

BRASS
COPPER
BOILER
TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
CARBON & ALLOY
STEELS
TOOL
STEELS
DRILL RODS
STAINLESS
AND
AT RESISTING
STEELS
NDEX
hnical Data
AUGES AND
WEIGHTS
Extras for
Size and
Quantity
CUTTING
EXTRAS

POTTSCO WELDING RODS
FOR OXY-ACETYLENE WELDING

Welding Rods	Finish	Chemical Analysis C	Mn	P	S	Si
POTTSCO No. 2	Copper	.012	.018	.004	.023	.003
POTTSCO No. 4	Copper	*.06	*.15	*.04	*.04	*.04
POTTSCO No. 8	Bare	Special Composition				
POTTSCO No. 10	Bare	.15-.25	.50-.80	*.04	*.04	.....
POTTSCO No. 12	Bare	.19-.75	.91-1.20	*.04	*.04	.....
POTTSCO No. 6	Bare	.85-1.10	.30-.60	*.04	*.04	.....

		C	Cr	Mo	Ni
POTTSCO Stainless No. 19/9 Gas Rod	Bare	.07	19.00		9.00
POTTSCO Stainless No. 4/6 Gas Rod	Bare	*.10	4.00-6.00	.40-.60	.....
POTTSCO Stainless No. 25/12 Gas Rod	Bare	*.20	25.00		12.00
POTTSCO Stainless No. 13 Gas Rod	Bare	*.12	12.00-14.00		.....
POTTSCO Stainless No. 17 Gas Rod	Bare	*.12	16.00-18.00		.....
POTTSCO Stainless No. 27 Gas Rod	Bare	*.25	23.00-30.00		.....

Note—POTTSCO No. 10 3½% Nickel contains 3.25% to 3.75% Nickel.

		Si
POTTSCO No. 34 Sureflo Cast Iron		
POTTSCO No. 36—see Pottsco No. 49		
POTTSCO No. 30 Cast Aluminum Alloy		.05
POTTSCO No. 32 Drawn Aluminum	Straight Aluminum—No Alloy	

POTTSCO Copper-Bronze and Brass Rods (see page 102).

*Maximum.

POTTSCO No. 2
(Page Armco Gas Welding Rod)

Recommended for all mild steel parts, castings and wrought iron.

It is a *Pure Ingot Iron* welding rod and has no equal in this field. See POTTSCO No. 1, page 93, for description.

POTTSCO No. 4
(Page "C" Gas Welding Rod)

An excellent all around mild *steel* gas welding rod. Produces strong, sound welds of uniform structure. However, the deposit metal will not develop the tensile strength or the ductility that is produced by the POTTSCO No. 8 ROD.

Used for general steel welding.

POTTSCO No. 8
(Page Hi-Tensile Gas Welding Rod)

This is a smooth, free flowing, non-sparking gas welding rod developing high tensile strength. Self-fluxing because of analysis.

Used for general steel and pipe welding. The chemical industry finds it the best rod for use on pipe lines and in and around buildings where fire hazards are greatest.

It is rapidly replacing the general mild steel gas welding rod.

POTTSCO No. 10
(Page 3½% Nickel Gas Welding Rod)

Makes high strength welds in nickel steel castings, shapes and plates. It will respond to the same heat treatment as the parent metal.

Welding operators find many uses for this rod where they want high tensile strength and high ductility in their finished welds.

For Available Sizes, Quantities and Packing: Page 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO No. 12

(Page Medium Carbon Gas Welding Rod)

This rod can be furnished with carbon content tolerances within any of the ranges listed below.

Used for welding:

- **.20-.25 Carbon steels such as forgings, boiler plate, structural steel.**
- **.25-.35 Carbon steels such as forgings, structural steel, wearing parts as valves, crank pins and gears.**
- **.35-.45 Carbon steels such as strong forgings, shafts and axles.**
- **.45-.55 Carbon steels such as crank pins and other parts subjected to shocks and heavy stress.**
- **.60-.70 Carbon steels such as bolt-heading and drop-forging dies.**
- **.70-.80 Carbon steels such as anvil facings, band saws, smithing hammers, shear blades, vise jaws, wrenches.**

We recommend heat treatment after welding in certain of above applications. Consult us for details.

POTTSCO No. 6

(Page High Carbon Gas Welding Rods)

Used for welding and building up high carbon steel parts such as:

- **.80-.90 Carbon steels—punches and dies, rock drills, machinist chisels, circular saws.**
- **.90-1.10 Carbon steels—springs, lathe centers, lathe planer, shaper tools, taps.**

Also used for building up rail ends, crossovers, frogs and switches of high carbon steel.

We recommend heat treatment after welding in certain of above applications. Consult us for details.

POTTSCO No. 34 SUREFLO CAST IRON GAS WELDING RODS

POTTSCO No. 34 CAST IRON WELDING RODS are made with the best cast iron pig obtainable and by-product coke. This, with constant laboratory control, guarantees uniformity, freedom from porosity, high silicon, and low sulphur content. Welds made with POTTSCO No. 34 RODS show no trace of silvery (chilled) metal on fracturing but a soft and machinable gray iron fracture. The weld deposit surface is free from oxide and hard spots. All this, together with the fact that welds made with POTTSCO No. 34 CAST IRON WELDING RODS use about one-half the flux used with ordinary rods, makes it the best and lowest priced rod on the market.

POTTSCO No. 36

(Page Hard-Surfacing Gas Welding Rods)

See description under POTTSCO No. 49, page 97.

For Available Sizes, Quantities and Packing: Page 104.

POTTSCO 30

(Cast Aluminum Alloy Gas Welding Rod)

This is an all-purpose welding rod for welding aluminum castings, automobile crank-cases, etc.

POTTSCO 32

(Drawn Aluminum Gas Welding Rod)

This rod is used for welding pure aluminum and common aluminum alloys—sheets and plates, also rolled and drawn aluminum parts.

ANACONDA
from mine to consumer
REG. U.S. PAT. OFF.

GAS WELDING RODS and ELECTRODES

Products of American Brass Company

Commercial Welding Rods	Approx. Melting Point "F"	Approx. T. S. in P. S. I.	Material Which Can be Welded	Welding Process Used	Chemical Elements
Tobin Bronze	1625°	54,000	Cast Iron, Steel, Brass, Copper, Everdur, and Other Copper Alloys	Oxy-acetylene, Atomic Hydrogen, Carbon Arc Torch	Copper, Zinc, Tin
Fumeless Bronze	1625°	54,000			Patented Copper, Zinc, Tin, etc.
Brazing Metal	1634°	50,000			Copper, Tin, high in Zinc
Economy Bronze	1625°	54,000			Copper, Zinc, Tin
Manganese Bronze	1598°	60,000			Copper, Tin, Zinc, Mn., Fe.
Deoxidized Copper	1981°	31,000	Elec. and Deoxi. Copper, Steel	Any	Copper, Silicon or Phosphorus
Electro-lytic Copper	1981°	30,000	Electrical Copper, Steel, Cast Iron	Oxyacetylene, Atomic Hydrogen, Carbon Arc	Copper, Oxygen, Silver
Phosphor Bronze "D"	1850°	60,000	Bronze, Brass, Copper, Steel	Any	Copper, Tin, Phosphor
Everdur	1866°	65,000	Everdur, Steel, Copper	Any	Copper, Mn. Silicon

POTTSCO FUMELESS BRONZE

A bronze welding rod of patented analysis for all general gas welding. We recommend this rod for all bronze and copper alloy welding as well as for steel and cast iron. Its low melting point and free-flowing characteristics make it exceptionally easy to use. This rod will produce welds of high tensile strength (see above) with excellent wearing qualities.

POTTSCO FUMELESS BRONZE, due to the dioxidizing agents included in the patented analysis, produces a sound, gas-free weld. No objectionable fumes are given off, making a most satisfactory rod from the viewpoint of the welder.

Many shops stock this one grade for all their bronze work, thus saving inventory costs.

For Available Sizes, Quantities and Packing: Page 104.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTSCO STAINLESS AND HEAT RESISTING ALLOY STEEL GAS WELDING RODS

(Page-Allegheny)

These are bare Chrome and Chrome-Nickel Alloy Gas Welding Rods. When the welding flame is adjusted properly, and a good Stainless Steel welding flux is used, these rods give a deposit equal to the base metal.

PAGE STAINLESS STEEL GAS WELDING RODS can be supplied in all standard analyses, and the following paragraphs describe the grade most generally used.

POTTSCO 19-9 S STAINLESS AND HEAT RESISTING ALLOY STEEL GAS WELDING RODS

(Page-Allegheny)
TYPE 306

Sizes for Immediate Shipment.

Diameter Inches	1/16	3/32	1/8	5/32	3/16	1/4
Length Inches	30	30	30	30	30	30
Standard Package Pounds	10 and 25	10 and 25	10 and 25	10 and 25	10 and 25	10 and 25

This type is used perhaps more than any other rod for welding on Stainless Steel. It is a corrosion-resistant steel for the widest range of applications. It makes a weld which is resistant to atmospheric or other moisture, salt water, milk, foodstuffs and most organic or inorganic chemicals; and one that will machine readily and take a high polish.

This rod contains approximately 19% Chromium and 9% Nickel, with a *very low Carbon content.* Heat treatment after welding is not always necessary, and where it is employed, does not harden the weld metal.

POTTSCO 19-9 S can also be furnished with TITANIUM or COLUMBIUM, or with 2/4% MOLYBDENUM.

POTTSCO STAINLESS AND HEAT RESISTING ALLOY STEEL GAS RODS

AVAILABLE FOR PROMPT SHIPMENT

POTTSCO 19-9—Cr Ni
POTTSCO 25-12—Cr Ni
POTTSCO 25-20—Cr Ni
POTTSCO 18-8 S MO—Cr Ni
POTTSCO 15-35—Ni Cr
POTTSCO 19-10 Cb—Cr Ni Stab.
POTTSCO 13—Chrome
POTTSCO 17—Chrome
POTTSCO 27—Chrome
POTTSCO 4-6—Chrome

BRASS COPPER
BOILER TUBES
ING CHAINS
CHAIN
WIRE ROPE
ELASTUF
CARBON & ALLOY STEELS
TOOL STEELS
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

POTTSCO ELECTRODES AND GAS WELDING RODS

LENGTHS — SIZES — PACKING

POTTSCO Nos. 1, 3, 9, 11, 23 and 25 ELECTRODES: Stock lengths 14″; sizes 1/16″, 3/32″, 1/8″, 5/32″, 3/16″, 1/4″, 5/16″, 3/8″; packed in 50 lb. Cartons or 100 lb. Coils and 200 lb. Reels.

POTTSCO Nos. 33, 37, 39 and 43 ELECTRODES: Stock length 14″; sizes 3/32″, 1/8″, 5/32″, 3/16″, 1/4″; packed in 50 lb. Cartons.

POTTSCO No. 35 ELECTRODE: Stock length 14″; sizes 3/32″, 1/8″, 5/32″, 3/16″, 1/4″; packed in 50 lb. Cartons or 150 lb. to 190 lb. Coils.

POTTSCO Nos. 5, 107, 29, 45 ELECTRODES: Stock length 14″ sizes 3/32″, 1/8″, 5/32″, 3/16″, 1/4″, 5/16″, 3/8″; packed in 50 lb. Boxes.

POTTSCO STAINLESS STEEL ELECTRODES: Stock length 15″; sizes 1/16″, 3/32″, 1/8″, 5/32″, 3/16″, 1/4″; packed in 10 lb. and 25 lb. Cartons.

POTTSCO No. 47 ELECTRODE: Stock length 18″; sizes 1/8″, 5/32″, 3/16″, 1/4″, 5/16″; standard 50 lb. Bundles.

POTTSCO No. 15 ELECTRODE: Stock length 18″; sizes 1/8″, 5/32″, 3/16″, 1/4″, 5/16″, 3/8″; standard 50 lb. Bundles.

POTTSCO No. 49 ELECTRODE, No. 36 GAS WELDING ROD: Size 1/4″; quantity as specified.

POTTSCO No. 31 ELECTRODE, Nos. 30 and 32 GAS WELDING RODS: Sizes 1/8″, 5/32″, 3/16″, 1/4″; quantity as specified.

POTTSCO Nos. 51, 53, 55 ELECTRODES, stocked in 1/16″ sizes from 1/8″ to 1″ and 1/8″ sizes from 1 1/8″ to 2″, then 2 1/2″ and 3″; quantity as specified: order by number, not by weight.

POTTSCO Nos. 2, 4, 6, 8, 10, and 12 GAS WELDING RODS: Stock length 36″; sizes 1/16″, 3/32″, 1/8″, 5/32″, 3/16″, 1/4″, 5/16″, 3/8″; packed in 50 lb. Cartons or 100 lb. Coils. Nos. 8, 10 not furnished in Coils.

POTTSCO STAINLESS STEEL GAS WELDING RODS: Stock length 30″; sizes 1/16″, 3/32″, 1/8″, 5/32″, 3/16″, 1/4″; packed in 10 lb. and 25 lb. Cartons.

POTTSCO No. 34: Sizes 1/8″, 3/16″, 1/4″, 5/16″, 3/8″ square; 5/32″ round; 1/2 hex. Standard 50 lb. Bundles.

ANACONDA COPPER and BRONZE RODS: Stock length 36″; sizes 1/16″, 3/32″, 1/8″, 5/32″, 3/16″, 1/4″, 5/16″, 3/8″; quantity as specified.

COLMONOY RODS No. 1: Stock length 14″; sizes 1/8″, 3/16″, 1/4″ Nos. 2, 3, 6: Stock length 12″; gas rod sizes 3/16″, 1/4″, 5/16″, 3/8″; electrodes 3/16″, 1/4″, 5/16″; quantity as specified.

POTTSCO 200-HOUR COVER GLASS

In the process of electric arc welding there is rapid bombardment of the cover glass by minute molten particles of metal. These molten particles fuse into the ordinary clear cover glass often making it necessary to change this glass once or twice every eight hours of actual welding.

The use of THE POTTSCO 200-HOUR COVER GLASS eliminates this as it gives clear vision for at least 200 hours while the ordinary cover glass visibility is cut down the first hour of use.

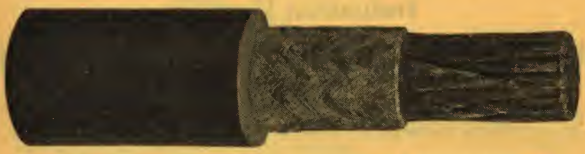
POTTSCO COVER GLASSES are processed on one side only, the side on which the trade name appears. *Be sure this side is exposed to the arc.*

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

TIREX WIRE and CABLE

With the SELENIUM Rubber Sheath



TIREX WELDING CABLE

s used for all arc welding and some electrical purposes. We stock the following standard sizes: #2, #1, #1/0, #2/0, #3/0, #4/0. Other sizes made to order.

TIREX All-Rubber PORTABLE CABLE

is recommended for all electrical purposes. Can be furnished in two, three and four conductor; concentric (2 cond.); and twin arallel.

TIREX RUBBER SHEATHED CORD

should be used generally for small electrical tools, lamps, ap-liances and apparatus.

"POTTSCO" OXY-ACETYLENE HOSE

One, two and three braided corrugated for oxygen and acetylene; lso seven-ply for oxygen.

"POTTSCO" WELDING AND BRAZING FLUXES

"Pottsco" WAC 1" Flux for Cast Iron
"Pottsco" WAC 3" Flux for Brazing
"Pottsco" WAC 4" Flux for Aluminum
"Pottsco" OC Flux for Stainless Steel

CARBON RODS, PLATES AND PASTE

These Welding Materials and Accessories are IN STOCK at ll times for IMMEDIATE DELIVERY. Just telephone.

POTTSCO ACCESSORIES

Dependable Protection for the Welding Operator and other Industrial Workers

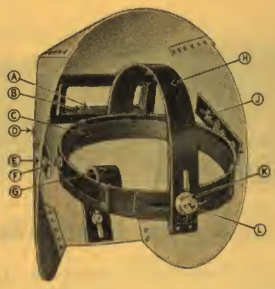
ARC-WELDERS' HELMETS HAND SHIELDS
OXY-ACETYLENE GOGGLES

POTTSCO-D WELDING LENSES

INDUSTRIAL PROTECTION GOGGLES

with standard protection, annealed, non-shatterable or colored lenses

RESPIRATORS



WELDERS' HELMET No. 202

Light, comfortable, easily adjustable, providing the fullest possible protection to the welder. Fitted with "Double-X" lenses and cover glass.

A—Fibre Gasket. B—Lens Retainer Spring. C—Sweat Pad. D—Side Screw for Arms. E—Binder Head Band Screw. F—Coil Spring. G—Chin Rest. H—Complete Headgear. J—Side Nut for Arms. K—Knurled Nut. L—Binder Head Screw.

HAND SHIELD No. 172

Light, convenient and exceptionally well made. Provides full protection to operator.

WELDERS' GOGGLES No. 50S

Sturdy, long-wearing, comfortable goggles with a non-rubber head band; fitted with POTTSCO-D Welding Lenses that meet Federal Specifications. Gives positive eye protection with comfort.

GRINDING GOGGLES No. 500M

Comfortable, lightweight construction. Close-fitting rolled edge, aluminum cups with ventilated sides. Packed in individual metal case.

SAFETY GOGGLES No. 311M

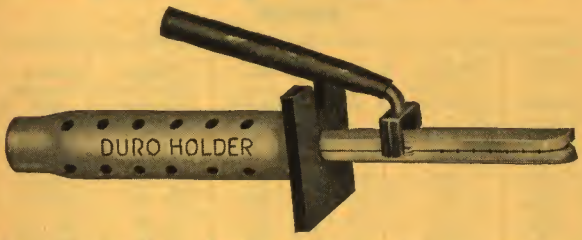
Extremely light in weight yet durable. Deep cups with curved lenses provide maximum vision. Well ventilated, easily adjustable. Packed in individual metal case.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

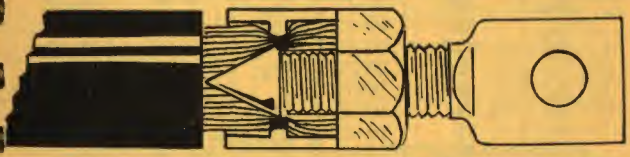
"DURO" Solderless HOLDER

The Aristocrat of Electrode Holders



ight and durable. Exceptionally strong, yet weighs only seventeen ounces.

"DURO" SOLDERLESS CONNECTOR



For positive, permanent connections on 1/0 and 2/0 flexible ables. Makes a perfect electrical connection in one minute. nstructions furnished with each connector.

"POTTSCO" WELDERS' GLOVES, SLEEVES WIRE BRUSHES

"THE POTTSCO"

Made of heavy ed horsehide. Will wear three o four times s long as cheaper makes.

"THE WELDER"

The best low-priced glove. Light, flexible, durable. Has 6½" gauntlet and all inside seams.

"POTTSCO" SLEEVES

They are made of selected tough chrome leather and are full size, providing greater protection for operator's arms.

"POTTSCO" BRUSH

A wire scratch brush made with curved handle for extra comfort in the operator's hand while preparing parent metal for welding or removing slag before applying next layer.

"POTTSCO" CARBON ARC HOLDERS

Made in various sizes for 200, 300, 400 and 600 amps. with individual jaws for holding any size carbon electrode from ½" to 1".

BRASS
COPPER
BOILER
TUBES
LING CHAINS
CHAIN
WIRE ROPE
ELASTUF
CARBON & ALLOY
STEELS
TOOL
STEELS
DRILL RODS
STAINLESS
AND
AT RESISTING
STEELS
INDEX
chnical Data
GAUGES AND
WEIGHTS
Extras for
Size and
Quantity
CUTTING
EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

ANACONDA

FREE CUTTING BRASS RODS

Rounds

Size in Inches	Weight Per Foot Pounds	Stock Lengths Feet	Size in Inches	Weight Per Foot Pounds	Stock Lengths Feet
1/16	.011	10–12	7/8	2.22	10–12
3/32	.026	10–12	15/16	2.55	10–12
1/8	.045	10–12	1	2.90	10–12
5/32	.071	10–12	1 1/16	3.27	10–12
3/16	.102	10–12	1 1/8	3.67	10–12
7/32	.139	10–12	1 3/16	4.09	10–12
1/4	.181	10–12	1 1/4	4.53	10–12
9/32	.229	10–12	1 5/16	4.99	10–12
5/16	.283	10–12	1 3/8	5.48	10–12
11/32	.342	10–12	1 7/16	5.99	10–12
3/8	.407	10–12	1 1/2	6.52	10–12
13/32	.478	10–12	1 9/16	7.07	10–12
7/16	.555	10–12	1 5/8	7.65	10–12
15/32	.636	10–12	1 11/16	8.25	10–12
1/2	.724	10–12	1 3/4	8.87	10–12
9/16	.917	10–12	2	11.59	10–12
5/8	1.13	10–12	2 1/4	14.67	10–12
11/16	1.37	10–12	2 1/2	18.11	10–12
3/4	1.63	10–12	2 3/4	21.91	10–12
13/16	1.91	10–12	3	26.08	10–12

Hexagons

3/16	.112	10–12	1	3.20	10–12
1/4	.200	10–12	1 1/16	3.61	10–12
5/16	.312	10–12	1 1/8	4.04	10–12
3/8	.449	10–12	1 3/16	4.51	10–12
7/16	.612	10–12	1 1/4	4.99	10–12
1/2	.799	10–12	1 5/16	5.50	10–12
9/16	1.01	10–12	1 3/8	6.04	10–12
5/8	1.25	10–12	1 7/16	6.60	10–12
11/16	1.51	10–12	1 1/2	7.19	10–12
3/4	1.80	10–12	1 5/8	8.44	10–12
13/16	2.11	10–12	1 3/4	9.78	10–12
7/8	2.45	10–12	1 7/8	11.23	10–12
15/16	2.81	10–12	2	12.78	10–12

Squares

1/8	.058	10–12	5/8	1.44	10–12
3/16	.130	10–12	3/4	2.08	10–12
1/4	.231	10–12	7/8	2.82	10–12
5/16	.360	10–12	1	3.69	10–12
3/8	.519	10–12	1 1/8	4.67	10–12
7/16	.706	10–12	1 1/4	5.76	10–12
1/2	.922	10–12	1 1/2	8.30	10–12

Rectangulars

1/8x 1/2	.231	10–12	1 1/4	.576	10–12
5/8	.288	10–12	1 1/2	.692	10–12
3/4	.346	10–12	1/8x2	.922	10–12
1	.461	10–12			

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

ANACONDA
FREE CUTTING BRASS RODS
Rectangulars

Size in Inches	Weight Per Foot Pounds	Stock Lengths Feet	Size in Inches	Weight Per Foot Pounds	Stock Lengths Feet
3/16x 1/2	.346	10–12	1/4x 1/2	.461	10–12
5/8	.432	10–12	5/8	.576	10–12
3/4	.519	10–12	3/4	.692	10–12
			1	.922	10–12
3/16x1	.692	10–12	1 1/4	1.15	10–12
1 1/4	.864	10–12	1 1/2	1.38	10–12
1 1/2	1.04	10–12	2	1.84	10–12
2	1.38	10–12	2 1/2	2.302	10–12

ANACONDA
HALF HARD SHEET BRASS

Thickness	Width	Wt. Per Foot	Thickness	Width	Wt. Per Foot
1/32" (.031)	16"	1.84	1/8" (.125)	16"	7.34
1/16" (.063)	16"	3.67	3/16" (.188)	16"	11.02
3/32" (.094)	16"	5.52	1/4" (.250)	16"	14.68

ANACONDA—COPPER SHEETS

		Stock Sizes and Weights per Sheet in Pounds				
		Soft Rolled		Cold Rolled		C. R. Strip Copper
		Plain	Tinned	Plain	Tinned	
12 oz.	30x 96	15.00	.....	.....	.....	.....
14 oz.	12x 96	7.00	.....	7.00	.....	.....
	14x 48	4.08	4.08	.....	.....	.....
	18x 96	10.50	.....	10.50	.....	.....
	20x 96	11.67	.....	.....	.....	.....
	24x 96	14.00	.....	14.00	.....	.....
	30x 96	17.50	17.50	17.50	17.50	.....
	36x 96	21.00	21.00	21.00	21.00	.....
16 oz.	10x 96	6.67	.....	6.67	.....	6.67
	12x 96	8.00	.....	8.00	.....	8.00
	13x 96	.....	.....	8.67	.....	8.67
	14x 48	4.67	4.67	.....	.....	.....
	14x 96	9.33	.....	9.33	.....	9.33
	15x 96	.....	.....	10.00	.....	10.00
	16x 96	10.67	.....	10.67	.....	10.67
	18x 96	12.00	.....	12.00	.....	.....
	20x 96	13.33	.....	.....	.....	.....
	24x 96	16.00	.....	16.00	.....	.....
	26x 96	17.33	.....	17.33	.....	.....
	30x 60	12.50	.....	.....	.....	.....
	30x 96	20.00	20.00	20.00	20.00	.....
	36x 96	24.00	24.00	24.00	24.00	.....
	48x 96	32.00	.....	.....	.....	.....
18 oz.	30x 96	22.50	.....	22.50	.....	.....
	36x 96	27.00	....	27.00	.....	.....
20 oz.	30x 96	25.00	.....	25.00	25.00	.....
	36x 96	30.00	.....	30.00	30.00	.....
24 oz.	30x 96	30.00	.....	30.00	.....	.....
	36x 96	36.00	.....	36.00	.....	.....
32 oz.	36x 96	.....	.....	48.00	.....	.....

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

BOILER TUBES

SEAMLESS STEEL—CHARCOAL IRON LAPWELD STEEL

Seamless Steel Boiler Tubes are manufactured by The Babcock & Wilcox Tube Co., and Charcoal Iron and Lapweld Steel Tubes by the Bethlehem Steel Co. Both concerns have wide experience in tube manufacture extending over many years.

These tubes conform to all State and Engineering codes, marine classification codes, and meet the requirements of the various insurance companies and railroads.

They are manufactured to rigid standards of concentricity, uniformity of wall thickness and of straightness.

The following straight tubes are carried in our Philadelphia stock:

STOCK LENGTHS BOILER TUBES

Outside Diameter	Wall Thickness B.W. Gage	All Grades
1″	#13	12′0″ 14′0″ 16′0″ 18′0″ 20′0″
1¼″	13	12′0″ 14′0″ 16′0″ 18′0″ 20′0″
1½″	13	12′0″ 14′0″ 16′0″ 18′0″ 20′0″
1¾″	13	12′0″ 14′0″ 16′0″ 18′0″ 20′0″
2″	13	11′0″ 12′0″ 13′0″ 14′0″ 15′0″ 16′0″ 17′0″ 18′0″ 20′0″
2″	12	18′0″ 20′0″ 24′0″
2″	11	18′0″ 20′0″ 24′0″
2″	10	9′2″ 18′1″ 20′1″ 24′0″
2″	9	9′2″
2¼″	13	18′0″ 20′0″
2½″	12	12′0″ 14′0″ 15′0″ 16′0″ 18′0″ 20′0″
2½″	10	16′0″ 17′0″ 18′0″
2¾″	12	18′0″ 20′0″
2¾″	10	16′0″
3″	12	11′0″ 12′0″ 13′0″ 14′0″ 15′0″ 16′0″ 17′0″ 18′0″ 20′0″
3″	10	16′0″ 18′6″ 20′1″
3″	9	18′0″
3¼″	11	16′0″ 20′0″
3¼″	10	14′0″ 18′0″
3½″	11	12′0″ 14′0″ 16′0″ 18′0″ 20′0″
3½″	10	16′0″ 18′0″
3½″	9	18′0″
4″	10	12′0″ 14′0″ 16′0″ 18′0″ 20′0″ 22′0″
4″	9	10′2″ 16′0″ 18′0″ 20′0″
4″	8	18′0″ 20′0″
4″	6	10′2″ 20′0″
4½″	10	16′1″ 18′1″ 20′1″
5″	9	18′1″ 20′1″
6″	7	24′0″

BENT TUBES FOR STIRLING BOILERS

The Babcock & Wilcox Tube Co. have available the manufacturers' (The Babcock & Wilcox Co.) record showing all the details of Stirling Boiler Tubes and are in position to produce these tubes to meet requirements in every respect.

It is only necessary for the customer to specify the job number and the position of the tubes in the boiler by number. All other information regarding diameter, thickness, lengths, etc. can be obtained from The Babcock & Wilcox Company's records.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

MAXIMUM ALLOWABLE WORKING PRESSURES FOR STEEL BOILER TUBES

A. S. M. E. Code

For Water-Tube Boilers

Outside Diam. of Tube in Inches D	Gauge—B. W. G. t = Thickness in Inches							
	13 t = 0.095	12 t = 0.109	11 t = 0.120	10 t = 0.134	9 t = 0.148	8 t = 0.165	7 t = 0.180	6 t = 0.203
1	758	...	...	...	...	...	...	...
1⅛	646	870	...	...	...	...	...	...
1¼	557	758	...	...	...	...	...	...
1½	422	590	722	...	...	...	...	...
1¾	326	470	583	727	871	...	...	...
2	254	380	479	605	731	...	...	...
2¼	198	310	398	510	622	758	...	...
2½	153	254	333	434	535	657	765	...
2¾	117	208	280	372	464	575	673	824
3	...	170	236	320	404	506	596	734
3¼	...	...	199	276	354	448	531	658
3½	...	...	167	238	310	398	475	594
3¾	...	...	139	206	273	355	427	537
4	...	...	...	178	240	317	385	488
4½	...	...	...	...	186	254	314	406
5	...	...	...	...	142	204	258	340

For Fire-Tube Boilers

Outside Diameter, Inches	Pressures in Pounds per Square Inch				
	175	200	225	250	275
1	13	12	12	12	12
1½	13	12	12	12	12
1¾	13	12	12	12	12
2	13	12	12	12	12
2¼	13	12	12	12	11
2½	12	11	11	11	10
3	12	11	11	10	10
3¼	11	10	10	9	9
3½	11	10	10	9	9
4	10	9	9	8	8
4½	10	9	8	8	7
5	9	8	7	7	6
5½	9	8	7	6	6
6	8	7	6	5	5

COPPER FERRULES

Thickness: 1/32", 1/16", ⅛", 3/32".

Widths: ½", ⅝", ¾", ⅞", 1".

Price on Application.

BOILER TUBES
LING CHAINS
CHAIN
WIRE ROPE
ELASTUF
CARBON & ALLOY STEELS
TOOL STEELS
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

ACCO SLING CHAINS

MADE BY
THE AMERICAN CHAIN DIVISION OF AMERICAN CHAIN & CABLE CO.

These slings are made from H.B. or AJAX Iron Dredge Chain as specified. Hooks, rings and joining links are of such size that they will withstand a load equal to the strength of the chain on which they are used. Sling Hooks are drop forged and designed so the load line will pass directly through the center of the bowl and eye of the hook. Welding is entrusted only to workmen who have had many years' experience, thus insuring perfect welds.

H.B. Chain is made from single refined, all puddled iron, without admixture of iron or steel scrap. AJAX Chain is made from double refined, all puddled iron, without admixture of iron or steel scrap. Both H.B. and AJAX grades will meet A.S.T.M. specifications for iron crane chain. See the latest A.S.T.M. specifications, Designation A-56, for details of manufacturing and physical and chemical requirements.

Complete prices and engineering data will be furnished on application.

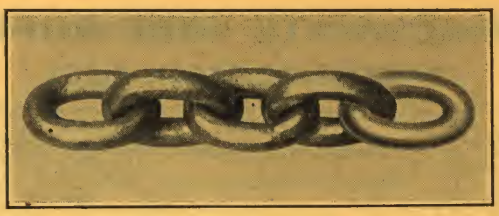
STYLE D Double sling chain with Ring and Sling Hooks. Sling Chains may be furnished with Pear Shaped Link and Grab Hooks if so specified.

STYLE S Single sling chain furnished with Ring and Sling Chain Hook. Pear Shaped Link and Grab Hooks will be furnished when so specified.

NOTE: Orders should specify type fittings wanted and bearing to bearing length which includes attachments. Complete catalog furnished on request.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260



ACCO PROOF COIL CHAIN

Proof Coil, or common coil chain, is made from basic open hearth steel. This grade is furnished self-colored unless otherwise specified. This chain is used for general purposes and is largely stocked by the jobbing trade. Every foot of this chain is proof tested.

Trade Size in Inches	Size Material in Inches	Inside Length in Inches	Inside Width in Inches	Links Per Foot	Weight Per 100 Ft. Pounds	Average Breaking Test Pounds	Proof Test Pounds	Safe Working Load Pounds
3/16	7/32	51/64	13/32	12½	40	2,090	1,045	520
¼	9/32	1	½	12	70	3,600	1,800	900
5/16	11/32	1 7/64	½	10¾	105	5,440	2,720	1,360
3/8	13/32	1 15/64	5/8	9¾	158	7,440	3,720	1,860
7/16	15/32	1⅜	¾	8¾	210	10,000	5,000	2,500
½	17/32	1½	13/16	8	265	13,200	6,600	3,300
9/16	19/32	1¾	⅞	6⅞	335	16,400	8,200	4,100
⅝	21/32	1⅞	1	6⅜	410	20,000	10,000	5,000
¾	25/32	2⅛	1⅛	5⅝	580	28,300	14,150	7,075
⅞	29/32	2½	1⅜	4¾	780	38,400	19,200	9,600
1	1 1/32	2¾	1½	4⅜	1000	49,600	24,800	12,400
1⅛	1 5/32	3⅛	1¾	3⅞	1270	62,400	31,200	15,600
1¼	1 9/32	3¼	1⅞	3¾	1560	76,800	38,400	19,200
1⅜	1 13/32	3⅞	2	3⅛	1860	92,000	46,000	23,000
1½	1 17/32	4⅛	2⅛	2⅞	2200	108,800	54,400	27,200

ACCO BBB COIL CHAIN

BBB Coil Chain is closer link than either the Proof Coil or BB Coil grades. Only the highest grade open hearth steel having the best welding qualities is used in the manufacture of this chain. The most skilled workmen only make this grade chain. Furnished self-colored or painted black. Test certificate will be furnished if desired. Every foot of this chain is proof tested.

Trade Size in Inches	Size Material in Inches	Inside Length in Inches	Inside Width in Inches	Links Per Foot	Weight Per 100 Ft. Pounds	Average Breaking Test Pounds	Proof Test Pounds	Safe Working Load Pounds
3/16	7/32	25/32	3/8	15½	43	2,600	1,300	650
¼	9/32	55/64	7/16	14	78	4,500	2,250	1,125
5/16	11/32	1	½	12	115	6,800	3,400	1,700
3/8	13/32	1 3/32	⅝	11	166	9,300	4,650	2,325
7/16	15/32	1 7/32	11/16	9¾	220	12,500	6,250	3,125
½	17/32	1 11/32	¾	9	295	16,500	8,250	4,125
9/16	19/32	1 9/16	¾	7¾	350	20,500	10,250	5,125
⅝	21/32	1 11/16	⅞	7⅛	430	25,000	12,500	6,250
¾	25/32	1⅞	1	6⅜	615	35,400	17,700	8,850
⅞	29/32	2¼	1¼	5⅜	820	48,000	24,000	12,000
1	1 1/32	2 9/16	1⅜	4¾	1045	62,000	31,000	15,500
1⅛	1 5/32	2⅞	1⅝	4⅛	1310	78,000	39,000	19,500
1¼	1 9/32	3 1/16	1¾	3⅞	1600	96,000	48,000	24,000
1⅜	1 13/32	3⅝	1⅞	3¼	1930	115,000	57,500	28,750
1½	1 17/32	3⅞	2	3⅛	2300	136,000	68,000	34,000

Dimensions and weights are approximate.

Sling Chains 112
Chain 113
Wire Rope 114 to 120
Bearing Metal 121

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

MACWHYTE WIRE ROPE

WAREHOUSE STOCK SIZES

Diam. in Inches	Construction and Grade	Breaking Str. in Tons of 2000 Lbs.	Approx. Weight Per Foot
1/4	6 x 19 Iron	.97	.10
5/16	6 x 19 Iron	1.43	.16
3/8	6 x 19 Iron	2.05	.23
P 1/2	6 x 19 Iron	3.57	.40
9/16	6 x 19 Iron	4.49	.51
P 5/8	6 x 19 Iron	5.52	.63
3/4	6 x 19 Iron	7.86	.90
3/8	8 x 19 Iron	1.6	.20
1/2	8 x 19 Iron	3.28	.36
1/4	6 x 42 Iron	.625	.07
5/16	6 x 42 Iron	.977	.11
3/8	6 x 42 Iron	1.40	.16
1/2	6 x 42 Iron	2.39	.28
P 1/2	8 x 19 Special Traction Steel	5.8	.36
P 5/8	8 x 19 Special Traction Steel	9.0	.57
P 1/2	6 x 19 Traction Steel	6.76	.40
P 5/8	6 x 19 Traction Steel	10.35	.63
3/4	6 x 19 Traction Steel	14.8	.90
1/2	6 x 19 Cast Steel	7.7	.40
5/8	6 x 19 Cast Steel	11.8	.63
5/16	6 x 19 Plow Steel	3.9	.16
3/8	6 x 19 Plow Steel	5.5	.23
7/16	6 x 19 Plow Steel	7.3	.31
P 1/2	6 x 19 Plow Steel	9.4	.40
P 5/8	6 x 19 Plow Steel	14.4	.63
P 3/4	6 x 19 Plow Steel	20.6	.90
7/8	6 x 19 Plow Steel	28.0	1.23
1	6 x 19 Plow Steel	36.5	1.60
3/8	6 x 37 Plow Steel	5.3	.22
P 1/2	6 x 37 Plow Steel	9.2	.39
5/8	6 x 37 Plow Steel	14.0	.61
3/4	6 x 37 Plow Steel	19.8	.87
1	6 x 37 Plow Steel	34.4	1.55
1 1/8	6 x 37 Plow Steel	43.5	1.96
1/2	8 x 19 Plow Steel	8.2	.36
P 3/8	6 x 19 Monarch	6.3	.23
P 1/2	6 x 19 Monarch	10.8	.40
* 9/16	6 x 19 Monarch	13.5	.51
P 5/8	6 x 19 Monarch	16.6	.63
P 3/4	6 x 19 Monarch	23.7	.90
1	6 x 19 Monarch	42.0	1.60
1/2	6 x 19 Monarch Lang Lay I.W.R.C.	11.61	.44
5/8	6 x 19 Monarch Lang Lay I.W.R.C.	17.85	.69
3/4	6 x 19 Monarch Lang Lay I.W.R.C.	25.47	.99
7/8	6 x 19 Monarch Lang Lay I.W.R.C.	34.61	1.35
1	6 x 19 Monarch Lang Lay I.W.R.C.	45.15	1.76
1 1/8	6 x 19 Monarch Lang Lay I.W.R.C.	56.97	2.23
1 1/4	6 x 19 Monarch Lang Lay I.W.R.C.	69.87	2.75
1/8	6 x 7 Iron Galvanized	.28	.023
3/16	6 x 7 Iron Galvanized	.61	.04
1/4	6 x 7 Iron Galvanized	.99	.09
5/16	6 x 7 Iron Galvanized	1.36	.15
1/4	6 x 42 Iron Galvanized	.56	.07
3/16	1 x 7 Guy & Messinger Galvanized	.575	.0073
1/4	1 x 7 Guy & Messinger Galvanized	.950	.012
5/16	1 x 7 Guy & Messinger Galvanized	1.6	.0205
3/8	1 x 7 Guy & Messinger Galvanized	2.12	.0273
1/2	1 x 7 Guy & Messinger Galvanized	3.7	.0517

Ropes marked P are also carried in Preformed.

Rope marked * carried only in I.W.R.C. Preformed.

(Continued on Next Page.)

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

MACWHYTE SILER SLING

ONE SIZE ONLY

The Macwhyte Siler Sling is made in one size only and comes packed in a bag complete ready for use with the rope already attached and with the auxiliary grapple hook.

SAFE LOADS

This sling is equipped with ⅜″ 6x19 I.W.R.C. Monarch Whyte Strand (improved Plow Steel) wire rope. When so equipped the safe loads are as follows: The following figures are based on a safety factor of 5.

Safe Loads Choker Hitch.....5000 lbs.
Safe Loads Basket Hitch.....7000 lbs.
Safe Loads Grapple Hook Assembly.5000 lbs

ROPE EASILY REPLACED

No hot socketing is necessary to replace the rope. It is attached by means of a wedge socket in the upper hook assembly. The wedge is easily removed with a hammer and new rope can be inserted in less than 10 minutes. Any mechanic can easily replace the rope and, if desirable, a longer or shorter rope can be used.

WEIGHS ONLY 35 POUNDS

Packed complete, the Macwhyte Siler Sling weighs but 35 lbs.

Complete Sling.....$40.00

When ordered separately as replacements:

Main Hook Assembly..... 23.00
Traveling Hook Assembly..... 9.50
Grapple Hook..... 7.50
⅜″—6x19 I.W.R.C. Preformed Monarch Wire Rope, per foot.... 0.146

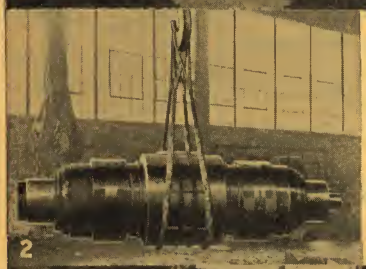
TRY ONE

Order one of these slings, give it a thorough trial, and prove to yourself its many advantages. It is what you have wanted for years and you'll find hundreds of lifts you can make with it easier, better, safer than you imagine.

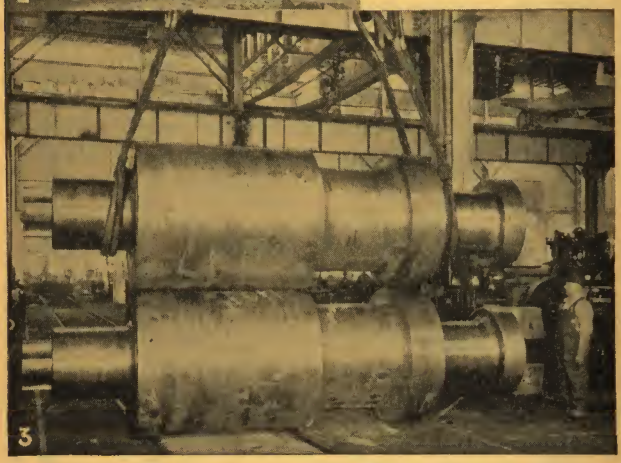
Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

MACWHYTE SLINGS



1. **MONARCH SLINGS:** Type No. 1, 2" 6x37 Rope
2. **DREW SLINGS:** (Braided Flat Body) Two type No. 1, six-part body.
3. **ATLAS SLINGS:** (Braided Round Body) Four type No. 5, sixteen-part body.



Macwhyte Slings are used wherever loads of varying sizes, shapes and weights must be efficiently handled. These safety slings are made for your job—they are not carried in stock. Our engineers will give your needs special consideration.

In addition to typical lifts shown above, Macwhyte Slings are recommended for handling

Airplanes	Forgings	Plates
Armatures	Foundry Flasks	Rails
Barrels	Gears, Girders	Strip Shafts
Bars, Beams	Ingot Molds	Slate, Steel
Billets	Lumber	Sheets, Stone
Boats, Boxes	Machinery	Structurals
Cargo	Marble	Tanks
Compressors	Housings	Transformer
Containers	Motors	Tubes
Die Blocks	Pipe	Turbines

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

MACWHYTE SLINGS
SINGLE AND MULTIPLE-PART

Close up view of body types shown on page 116.

The great variety in size, shape, and kind of materials handled with slings, requires a wide range of types to meet the individual conditions. There is practically no kind of work needing slings that cannot be handled with maximum safety and economy by the various types of Macwhyte Single and Multiple-Part Wire Rope Slings.

There are three kinds of sling bodies available—ATLAS, DREW, and MONARCH.

The ATLAS Slings are made of two endless wire rope elements braided to form a sling body with extreme flexibility and maximum strength. They are non-kinking, non-spinning, and remain highly flexible throughout their life.

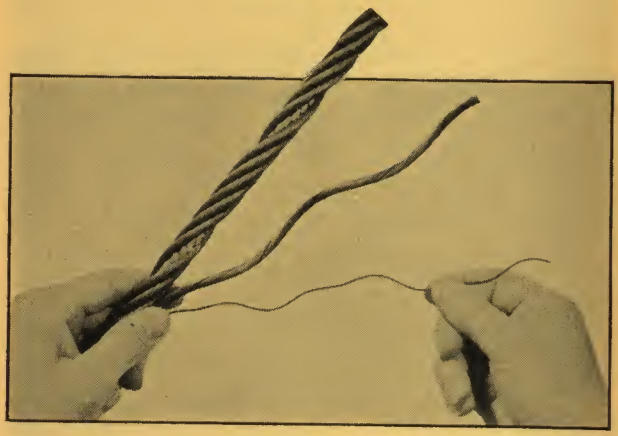
The DREW Slings are made of one wire rope endless element braided to form a sling body having multiple parts of wire rope which increase its flexibility and make a high strength flat sling. Its light weight facilitates attachment to crane hooks and the flat surface gives good bearing for material handled.

The body of the Macwhyte MONARCH Sling consists of a single Monarch Whyte Strand Wire Rope, the strongest of hoisting ropes. It is used where flexibility is not a prime requisite.

Catalog on Macwhyte Single and Multiple-Part Wire Rope Slings will be furnished on request.

MACWHYTE PREFORMED

WIRE ROPE



Macwhyte Company manufactures both PREFORMED and non-preformed wire rope.

In *Macwhyte* PREFORMED wire rope, the wires and strands are formed in the helical shape they take in the finished rope, as shown in above photograph.

The wires lie naturally in place, internal stress and friction is reduced to the minimum. Fatigue-resisting qualities are increased, thus giving longer and better service.

Macwhyte PREFORMED wire rope is safer to handle because wires broken from wear lie flat against the rope instead of wickering out.

Improved service is given especially where bending is a factor, such as in excavating, mining, rotary drilling, logging, quarrying, etc. Send for special descriptive folder "The WHY in MacWHYte PREFORMED Wire Rope."

Whenever you are in doubt as to whether you are ordering the best wire rope for your particular use, just tell us what kind of equipment you are using, the work being done, and we will be glad to recommend the best rope for your use.

Macwhyte Wire Rope is carried in stock for prompt delivery.

PROPER WORKING LOAD

It is never advisable for the working load of a wire rope for general purposes, particularly running ropes, to exceed one-fifth of the breaking strength. This means that the factor of safety should be not less than five. To determine proper working load, divide the breaking strength by the proper factor of safety, e.g., a ⅞" diameter 6 x 19 Plow Steel Rope has a breaking strength of 28 tons and with a factor of safety of five the proper working load would be not over 5.6 tons.

For List of Stock Sizes: Page 114.

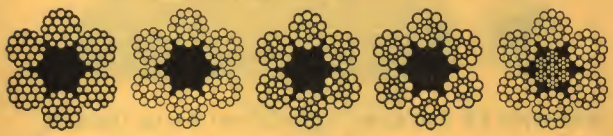
Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

MACWHYTE STANDARD HOISTING ROPE

6 x 19

"Standard Hoisting Rope" is a term generally applied to wire rope having 6 strands, 19 wires to the strand, with one hemp core. It is made in various wire constructions and grades to suit individual operating conditions.



6 x 19E (Warrington)	6 x 19F (Ftller)	6 x 16F (Filler)	6 x 19G (Seale)	6 x 19F IWRC.

MACWHYTE INTERNAL LUBRICATION

Through proper lubrication, *Macwhyte* Internally Lubricated Wire Rope resists internal rust, corrosion, and friction; the inside wires are usually in excellent condition after the outside wires are worn through and have given maximum service.

An ideal lubricant must protect the inside bearing surfaces of the wires by filling the spaces between them. It must keep out moisture, and resist ordinary acids. It must be a tenacious, heavy substance that will cling to the wires unaffected by the hottest or coldest climatic temperatures.

Such is the lubricant used in *Macwhyte* Wire Rope. Because it retains its heavy consistency, even when heated to more than 200°, it must be pumped by a special machine, invented at *Macwhyte* Company for the purpose.

You can have *Macwhyte* Internal Lubrication in either PREFORMED or Non-Preformed Ropes with no extra charge. Samples of Internally Lubricated and PREFORMED Wire Ropes will be furnished on request.

Macwhyte Internal Lubrication is one of the two visible outstanding improvements in wire rope in many years. PREFORMING is the other. For more complete information send for special circular "*Macwhyte* Internal Lubrication."

Complete catalog and prices will be furnished upon request.

ELASTUF
CARBON & ALLOY STEELS
TOOL STEELS
DRILL RODS
STAINLESS AND HEAT RESISTING STEELS
INDEX
Technical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS
ELASTUF

MACWHYTE SPECIAL TRACTION ELEVATOR ROPE

8 x 19

MACWHYTE SPECIAL TRACTION 8 x 19 (SEALE)

Macwhyte Special Traction Elevator Rope is the original Special Traction, and, as the name indicates, is built especially to meet the exacting conditions found on the modern traction types of high speed elevators.

It combines great toughness and flexibility and contains an arrangement of wires (strand construction) that produces a maximum of wearing surface.

It contains two more strands than the ordinary 6 x 19 hoisting rope and 33% more points of contact on the sheaves. The two extra strands add much to the flexibility, and the additional points of contact greatly increase the traction between the rope and the driving drums. In addition the rope will stand more abrasive wear, which is an important factor on passenger and freight elevator work.

Macwhyte Special Traction Elevator Rope on U and V groove traction elevators will give excellent service. It will withstand abrasion for long periods because of the comparatively large wires on the outside.

For complete list of warehouse stock sizes of elevator ropes: page 103.

Complete catalog and prices will be furnished upon request.

18-8 STAINLESS STEEL WIRE ROPE

The well known MACWHYTE WIRE ROPE is available promptly in 18-8 Stainless Steel in a wide variety of sizes and forms, in the following constructions: 1 x 19, 6 x 7, 6 x 7 WSC, 6 x 19, 6 x 19 WSC and 6 x 42. Prices and further information will be furnished upon request.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

BEARING METALS
DUTCH BOY
"PERFECTION" ANTI-FRICTION

This is a popular-priced, copper-hardened metal showing a crushing strain approximating that of the highest priced metals. It is recommended as a safe, reliable metal for use on Textile Machinery, Printing and Paper Making Machinery, Stationary Hoisting and Traction Engines, Woodworking Machinery of every description, Pumps, Cotton Gins and Compressors, Brick Machines, Stone Crushers, Agricultural Machinery and for general Machine Shop Work.

"PERFECTION" Anti-Friction Metal provides the following advantages:

1. It has a low melting temperature.
2. It can be repeatedly remelted without deterioration.
3. It remains in a molten state longer than most bearing metals.
4. It flows freely, completely filling all parts of the bearing.
5. It will stand up under the heaviest loads, yet is so soft that dust and grit will become imbedded in the metal instead of remaining on the surface and scratching the shaft or spindle.
6. It has a minimum frictional coefficient.
7. It requires the least amount of oil for proper lubrication.
8. Its shrinkage is reduced to the minimum.

FRICTIONLESS METAL

FRICTIONLESS Metal is a true Anti-Friction metal of merit. It is of Lead base, toughened with Tin and hardened with Copper, and has a low coefficient of friction. For general railroad and machine shop purposes, it is unexcelled. FRICTIONLESS is almost universal in its application, and will stand high speeds and severe service. It is internationally known, and carries a guarantee of satisfaction.

Used by Saw and Planing Mills; Mining and Brick Plants; Paper, Flour and Cotton Oil Mills; Machinery Manufacturers.

FORGINGS

We can furnish promptly Forgings of all grades of our ELASTUF Steels, POTTS JJ, Alloy Steels, Tool Steels, and Stainless Steels, in all sizes and shapes.

These Forgings can be supplied smooth forged or rough turned; annealed or heat treated to desired specifications.

Rings, Shafts, Special Shapes

Send us your inquiries

SATISFACTORY
PRICES AND DELIVERIES

GRAIN SIZE CONTROL

This control imparts increased uniformity and develops maximum machinability and response to heat treatment. All our ELASTUF Special Machinery Steels and also our POTTS JJ quality (Pages 38-46) have this extra quality added.

ELASTUF STEELS

See Following Pages

for

Information on

ELASTUF

STEELS

ELASTUF STEELS

"A Standard of Quality"

Grades:
- ELASTUF MEDIA—Hot Rolled
- ELASTUF MEDIA—Precision Finish
- ELASTUF PENN—Hot Rolled
- ELASTUF PENN—Cold Finished
- ELASTUF S. A. E. 2335—Hot Rolled
- ELASTUF S. A. E. 3140—Hot Rolled
- ELASTUF S. A. E. 3140—Heat Treated
- ELASTUF CHRO-MOLY—Heat Treated
- ELASTUF TYPE A—Annealed
- ELASTUF TYPE A—Heat Treated

The very extensive and successful use by industry, for the past *twenty-five years,* of our ELASTUF Machinery Steels has caused the name "ELASTUF" to be recognized as "A Standard of Quality" in carbon and alloy machine steels. The results of our close observations of this wide application of ELASTUF Steels during this time have been carefully recorded, compared, and analyzed. This invaluable data, combined with extensive research facilities, has resulted in the present high manufacturing standards peculiar to ELASTUF Machinery Steels.

A few of these many refinements are: careful selection of heats, close chemical control, heavy discards on ingots and blooms, and frequent etched disc inspection; all of which tend to eliminate faulty steel.

Accurate control of temperatures during manufacturing operations of the *untreated* stock, and with the *heat treated* bars the most exacting methods as to time, temperature, quenching and drawing, give our ELASTUF Steels remarkable freedom from distortion in machining operations.

McQuaid Ehn grain size control is employed on all ELASTUF Steels to improve machinability and response to heat treatment.

When you specify any of the ELASTUF Steels you have the confidence of knowing that your costs of labor and installation are being put on a steel which is as nearly perfect as human ingenuity can produce.

All the quality refinements of ELASTUF Steels are available to you at no extra cost. It is to your advantage to specify and insist upon ELASTUF Steels in either standard S.A.E. or special analyses.

ELASTUF MEDIA

MACHINERY STEEL

HOT ROLLED

Physical Qualities: Tests taken from sizes up to 1½" Round.

As Rolled Condition			After Heat Treatment (Quenched in water from 1550 °F. Drawn to 1200 °F.).	
80/90,000	Lbs. Per Sq. In.	Tensile Strength	95,000	Lbs. Per Sq. In.
45/50,000		Yield Point	63,000	
16/26%		Elong. in 2"	28%	
32/42%		Red. of Area	60%	
170/210		Brinell	201	

All physical properties shown are average, and cannot be guaranteed. Finishing temperatures, permissible variation in analysis, and size, each may cause a change in physicals.

iladelphia
Gent 7450
ark 5351
Baltimore
non 8260

ELASTUF MEDIA
MACHINERY STEEL
HOT ROLLED

S. A. E. 1045 .40/.50c Open Hearth.

Where to Use: For machinery parts where a stronger and tougher steel than POTTS JJ (Page 38) is required, and yet where the maximum physical qualities and uniformity of ELASTUF PENN are not necessary.

When to Use: When considerable increase in strength is desirable, and good machining qualities are necessary.

Physical Qualities: Page 123.

ROUNDS

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
3/8	.376	.40	20–22
1/2	.668	.20	20–22
5/8	1.043	.10	20–22
3/4	1.502	Base	20–22
7/8	2.044	Base	20–22
1	2.67	Base	20–22
1 1/8	3.38	Base	20–22
1 1/4	4.17	Base	20–22
1 3/8	5.05	Base	20–22
1 1/2	6.01	Base	20–22
1 5/8	7.05	.10	20–22
1 3/4	8.18	.10	20–22
1 7/8	9.39	.10	20–22
2	10.68	.10	20–22
2 1/8	12.06	.15	20–22
2 1/4	13.52	.15	20–22
2 3/8	15.07	.15	20–22
2 1/2	16.69	.15	20–22
2 5/8	18.40	.20	20–22
2 3/4	20.20	.20	20–22
2 7/8	22.07	.20	20–22
3	24.02	.20	20–22
3 1/8	26.08	25	20–22
3 1/4	28.20	25	20–22
3 3/8	30.42	25	20–22
3 1/2	32.71	25	20–22
3 5/8	35.09	25	20–22
3 3/4	37.56	.25	20–22
4	42.73	.25	20–22
4 1/4	48.24	.25	20–22
4 1/2	54.07	.25	20–22
4 3/4	60.25	.35	20–22
5	66.76	.35	20–22
5 1/4	73.60	.45	20–22
5 1/2	80.77	.45	20–22
5 3/4	88.29	.55	20–22
6	96.14	.55	20–22
6 1/4	104.30	.65	20–22
6 1/2	112.80	.65	20–22
6 3/4	121.70	.75	20–22
7	130.80	.75	20–22
7 1/4	140.40	.75	20–22
7 1/2	150.20	.75	20–22
8	171.00	1.10	20–22

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 300-304.

ELASTUF PENN

MACHINERY STEEL

HOT ROLLED

Analysis: ELASTUF PENN is a special analysis, approximately .40 C. steel of the Manganese type, without Chromium. While, because of its analysis, it might be called an alloy steel, we avoid the use of the term, classing an alloy steel as one containing appreciable quantities of one or more of the alloying elements of Chromium, Vanadium, Nickel, Molybdenum, etc.

Quality: Made under accurate quality control, thus assuring a clean steel of uniform structure. Free from all mechanical defects such as seams, pipes, laps, etc. Manufactured under Grain Size Control. Useful for a wide variety of purposes calling for maximum strength short of that of *heat treated alloy steels.*

Finish and Straightness: Hot rolled finish. All bars machine straightened. Can be used in automatics. Can also be furnished Cold Drawn, Turned and Polished and Turned, Ground and Polished.

Machining Operations: Outstanding characteristics of ELASTUF PENN are its free machining qualities and its ability to take a fine finish. It is *easily machined without annealing*. Special processing minimizes strains, and thus distortion or warping in machining hot rolled bars is rare. ELASTUF PENN cuts freely, without tearing, on all operations of turning, milling, threading, boring, reaming, etc., and on turrets and automatics.

Comparison of Grades: Because of its higher physical properties and better machinability, compared with plain carbon steels and untreated or annealed alloy steels, it may be used in place of the following *untreated* or *annealed* steels, viz.:

S.A.E. 1040, 1045, 1050, 1340, 1350, 3130, 3135, 3140, 3145, 3150, 2330, 2335, 2340, 2345, 2350, 4130, 4135, 4140, 4145, 4150.

iladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260
TOOL STEELS
DRILL RODS
STAINLESS AND AT RESISTING STEELS
FENCES
INDEX
hnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

ELASTUF PENN
MACHINERY STEEL
HOT ROLLED

Physical Properties (Natural as Rolled): Due to properly balanced analysis, ELASTUF PENN will show physicals beyond those of straight carbon machinery steels and approximately equal to most untreated alloy steels.

Average		Typical Tests	
Up to 2″ Rd.		1″ Rd.	5″ Rd.
100/120,000	Tens. Str. / Lbs. Per	110,000	103,000
60/70,000	Yield Pt. \ Sq. In.	66,000	57,500
15/25%	Elong. in 2″	24%	17.5%
30/45%	Red. of Area	52%	44.85%
179/217	Brinell	207	196

All physical properties shown are average and cannot be guaranteed. Finishing temperatures, permissible variation in analysis and size, each may cause a change in physicals.

Heat Treatment: Controlled quality in ELASTUF PENN insures excellent response to heat treatment, with minimum distortion.

We recommend oil quenching at temperatures varying from 1550° F. to 1600° F., depending on mass. Thorough heating to allow for complete change of structure is important.

Quenching baths must be ample in size. Drawing temperatures will vary with the purpose. For gears, worms, pinions, etc., we suggest 500° F. For shafts, axles, etc., we suggest 1100/1200° F. Machined parts, such as gear blanks, may be hardened to 50/60 Rock. C.

The following table shows minimum physical properties to be expected in the heat treated condition at approximately 1150° F. draw:

	T.S	Y.P.	El.	Red.
Up to 2″ Rd.	120,000	85,000	18	55
2″ to 4″	110,000	75,000	18	50
4″ to 6″	100,000	65,000	18	45
6″ to 8″	90,000	60,000	18	40

Cyanide Hardening: ELASTUF PENN may be cyanide hardened to great advantage for certain work. We recommend oil quenching.

ELASTUF PENN
MACHINERY STEEL
HOT ROLLED

Carburizing: ELASTUF PENN may be carburized for specific purposes and responds readily to proper treatment. Consult us as to methods.

Water Hardening: Water hardening with ELASTUF PENN may be done with safety only with great caution, and with careful consideration of details of piece to be hardened. The effect is to increase hardness greatly, with much higher tensile and elastic limit, but with a considerable loss of ductility and tendency to brittleness.

Forgings: All sizes and shapes can be supplied promptly from ELASTUF PENN forging billets carried in stock.

Heat Treated Bars and Forgings: We can furnish all sizes in bars and forgings heat treated to meet customers' requirements.

Mill Shipment: We can supply promptly ELASTUF PENN in all sizes, shapes and finishes.

Applications and Purposes: In general ELASTUF PENN should be used where maximum strength in a carbon machinery steel is required, or where untreated Alloys of the simpler type have been used.

- Axles
- Bars—Boring, Dolly, Slide and Slice
- Bolts—Heavy Duty
- Bucket Teeth
- Die Holders
- Gears, Pinions, Worms
- Journals
- Pins—Coupler, Crank, Cross-Head, Pilot or Guide Gudgeon, Hinge
- Piston Rods and Pump Rods
- Rolls—Corrugated, Feed and Picker
- Shafts for Rigidity and Strength
- Spindles
- Screws for Stiffness, Strength and Wearing Qualities
- Tool Bodies and Shanks
- Textile Machine Parts

The above list merely suggests the wide application of ELASTUF PENN. Its chief function is to reduce breakage on heavy duty parts, to save expensive replacements due to excessive wear, and to keep machinery running "sweet"—because it longer resists tendency of shafts to take a permanent set under heavy loads.

Consult us about ELASTUF PENN. Our accumulated data, our experience and engineering knowledge, are at your command without charge or obligation.

ELASTUF PENN

MACHINERY STEEL

HOT ROLLED

ROUNDS

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
3/8	.376	.40	20–22
7/16	.511	.30	20–22
1/2	.668	.20	20–22
9/16	.845	.15	20–22
5/8	1.043	.10	20–22
11/16	1.262	.10	20–22
3/4	1.502	Base	20–22
13/16	1.763	Base	20–22
7/8	2.044	Base	20–22
15/16	2.347	Base	20–22
1	2.67	Base	20–22
1 1/16	3.01	Base	20–22
1 1/8	3.38	Base	20–22
1 3/16	3.77	Base	20–22
1 1/4	4.17	Base	20–22
1 5/16	4.60	Base	20–22
1 3/8	5.05	Base	20–22
1 7/16	5.52	Base	20–22
1 1/2	6.01	Base	20–22
1 9/16	6.52	.10	20–22
1 5/8	7.05	.10	20–22
1 11/16	7.60	.10	20–22
1 3/4	8.18	.10	20–22
1 13/16	8.77	.10	20–22
1 7/8	9.39	.10	20–22
2	10.68	.10	20–22
2 1/16	11.36	.10	20–22
2 1/8	12.06	.15	20–22
2 1/4	13.52	.15	20–22
2 3/8	15.07	.15	20–22
2 1/2	16.69	.15	20–22
2 5/8	18.40	.20	20–22
2 3/4	20.20	.20	20–22
2 7/8	22.07	.20	20–22
3	24.03	.20	20–22
3 1/8	26.08	.25	20–22
3 1/4	28.20	.25	20–22
3 3/8	30.42	.25	20–22
3 1/2	32.71	.25	20–22
3 5/8	35.10	.25	20–22
3 3/4	37.56	.25	20–22
4	42.73	.25	20–22
4 1/4	48.24	.25	20–22
4 1/2	54.07	.25	20–22
4 3/4	60.25	.35	20–22

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 300-302.

COLD FINISHED ELASTUF PENN: Pages 34-35.

ELASTUF PENN

MACHINERY STEEL

HOT ROLLED

ROUNDS

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
5	66.76	.35	20–22
5¼	73.60	.45	20–22
5½	80.77	.45	20–22
5¾	88.29	.55	20–22
6	96.14	.55	20–22
6¼	104.30	.65	20–22
6½	112.80	.65	20–22
6¾	121.70	.75	20–22
7	130.80	.75	20–22
7¼	140.40	.75	20–22
7½	150.20	.75	20–22
8	171.00	1.10	20–22
*8½	193.00	3.55	14–16
*9	216.30	3.55	14–16
*10	267.00	3.55	14–16

*Hammered and Rough Turned.

SQUARES

¾	1.91	Base	20–22
⅞	2.61	Base	20–22
1	3.40	Base	20–22
1⅛	4.31	Base	20–22
1¼	5.31	Base	20–22
1⅜	6.43	Base	20–22
1½	7.65	Base	20–22
1⅝	8.98	.10	20–22
1¾	10.41	.10	20–22
2	13.60	.10	20–22
2¼	17.22	.15	20–22
2½	21.25	.15	20–22
2¾	25.71	.20	20–22
3	30.60	.20	20–22
3½	41.65	.25	20–22
4	54.40	.25	20–22
4½	68.85	.25	20–22
5	85.00	.35	20–22

Warehouse Quantity Extras and Deductions: Page 295.

Warehouse Cutting Extras: Pages 300-302.

COLD FINISHED ELASTUF PENN: Pages 34-35.

iladelphia
Gent 7450
ark 5351
altimore
non 8260

TOOL STEELS
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

ELASTUF S.A.E. 2335

3½% NICKEL ALLOY MACHINERY STEEL

HOT ROLLED

Analysis: A standard S.A.E. 2335 Steel in analysis, combined with the close and careful mill control and inspection used in all our ELASTUF Steels to insure uniformity and freedom from mechanical defects.

Characteristics: ELASTUF S.A.E. 2335 Hot Rolled Bars are machine straightened. Bars may be readily machined and forged and respond well to heat treatment. The following are the average Hot Rolled Physical Properties on sizes up to 1½″ Rd.

Tensile Strength	90/100,000 Lbs. per Sq. In.
Yield Point	55/65,000 Lbs. per Sq. In.
Elongation in 2″	18/28%
Reduction of Area	42/52%
Brinell	170/212

Treatment:

Forging Temp.	2000/2150° F.—Down to 1600° F.
Normalizing Temp.	1650/1700° F.—Cool in Still Air
Annealing Temp.	1450/1500° F.—Furnace Cool
Hardening Temp.	1450/1500° F.—Quench in Oil
Drawing Temp.	Depends on desired properties.

Consult us for detailed heat treating instructions as to heating and cooling rates and times, drawing temperatures, etc.

EMERGENCIES and BREAKDOWNS

We can serve you promptly at all Hours, Day and Night, Sundays and Holidays.

REGent 7457

ELASTUF S.A.E. 2335

3½% NICKEL ALLOY MACHINERY STEEL

HOT ROLLED

ROUNDS

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
½	.667	.20	20–22
⅝	1.04	.10	20–22
¾	1.50	Base	20–22
⅞	2.04	Base	20–22
1	2.67	Base	20–22
1⅛	3.38	Base	20–22
1¼	4.17	Base	20–22
1⅜	5.05	Base	20–22
1½	6.01	Base	20–22
1⅝	7.05	Base	20–22
1¾	8.18	Base	20–22
2	10.68	Base	20–22
2¼	13.52	Base	20–22
2½	16.69	Base	20–22
2¾	20.20	Base	20–22
3	24.03	Base	20–22
3¼	28.20	.10	20–22
3½	32.71	.10	20–22
3¾	37.56	.15	20–22
4	42.73	.15	20–22
4¼	48.24	.25	20–22
4½	54.07	.25	20–22
4¾	60.25	.35	20–22

Warehouse Quantity Extras: Page 294.

Warehouse Cutting Extras: Pages 298, 300-302.

INSIST ON ELASTUF STEELS

Whether it be carbon or alloy, standard or special analysis, insist on ELASTUF steels to insure highest quality, greatest uniformity, ability to go through the shop economically and give long service. All this at no extra cost over ordinary steels. It is to your advantage to insist on ELASTUF steels.

iladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260

ELASTUF S.A.E. 3140

CHROME NICKEL ALLOY MACHINERY STEEL

HOT ROLLED

Analysis: A standard S.A.E. 3140 Steel in analysis, combined with the close and careful mill control and inspection used in all our ELASTUF Steels to insure uniformity and freedom from mechanical defects.

Characteristics: ELASTUF S.A.E. 3140 is stocked in Hot Rolled Bars (see page 134 for Heat Treated Bars). All bars are machine straightened. Hot Rolled Bars may be readily machined and forged and respond well to heat treatment. The following are the average Hot Rolled Physical Properties on sizes up to 1½" Rd.

Tensile Strength	100/115,000 Lbs. per Sq. In.
Yield Point	70/80,000 Lbs. per Sq. In.
Elongation in 2"	12/22%
Reduction of Area	35/45%
Brinell	207/248

Treatment:

Forging Temp.	2000/2150° F.—Down to 1600° F.
Normalizing Temp.	1650/1700° F.—Cool in Still Air
Annealing Temp.	1450/1500° F.—Furnace Cool
Hardening Temp.	1500/1550° F.—Quench in Oil
Drawing Temp.	Depends on desired properties.

Consult us for detailed heat treating instructions, as to heating and cooling rates and times, drawing temperatures, etc.

ELASTUF ALLOY STEEL FORGINGS

SMALL AND LARGE RINGS AND DISCS
CRANKSHAFTS
SPECIAL AND ODD SHAPES
SMOOTH FORGED OR
ROUGH MACHINED
ALL ANALYSES
ANY HEAT TREATMENT
ANY PHYSICALS

We can supply promptly all types of forgings in our ELASTUF steels or in any standard analysis.

SEND US YOUR INQUIRIES

ELASTUF S.A.E. 3140

CHROME NICKEL ALLOY MACHINERY STEEL

HOT ROLLED

ROUNDS

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Stock Lengths Feet
1/2	.667	.20	20–22
5/8	1.04	.10	20–22
3/4	1.50	Base	20–22
7/8	2.04	Base	20–22
1	2.67	Base	20–22
1 1/8	3.38	Base	20–22
1 1/4	4.17	Base	20–22
1 3/8	5.05	Base	20–22
1 1/2	6.01	Base	20–22
1 5/8	7.05	Base	20–22
1 3/4	8.18	Base	20–22
1 7/8	9.39	Base	20–22
2	10.68	Base	20–22
2 1/4	13.52	Base	20–22
2 1/2	16.69	Base	20–22
2 3/4	20.20	Base	20–22
2 7/8	22.07	Base	20–22
3	24.03	Base	20–22
3 1/4	28.20	.10	20–22
3 1/2	32.71	.10	20–22
3 3/4	37.56	.15	20–22
4	42.73	.15	20–22
4 1/4	48.24	.25	20–22
4 1/2	54.07	.25	20–22
4 3/4	60.25	.35	20–22

Warehouse Quantity Extras: Page 294.

Warehouse Cutting Extras: Pages 298, 300-302.

BREAKDOWNS—EMERGENCY REQUIREMENTS

We can meet your emergency needs equally well after regular business hours. Holidays, Sundays, etc., call our Emergency Phone—

REGent 7457

iladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260
TOOL STEELS
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

ELASTUF S.A.E. 3140
CHROME NICKEL ALLOY MACHINERY STEEL
HEAT TREATED

This grade is the same as described on page 132 under Hot Rolled except that bars are Heat Treated to definite physical properties. These properties, as listed on page 124, are not the average of a 1″ round sample but are the actual physicals to be expected from each range of sizes shown. This grade is useful for highly stressed parts where the physical properties of ELASTUF PENN Machinery Steel (see page 126) are insufficient, and where the higher strength and greater toughness of ELASTUF TYPE A Heat Treated are not needed. *It is readily machinable.*

ROUNDS

Tensile Strength	125/135,000 lbs. per sq. in.
Yield Point	105/115,000 lbs. per sq. in.
Elongation in 2″	16/22%
Reduction of Area	50/55%
Brinell (Average)	262/320

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Pound	Stock Lengths Feet
1/2	.667	.20	2.5	20–22
5/8	1.04	.10	2.5	20–22
3/4	1.50	Base	2.5	20–22
7/8	2.04	Base	2.5	20–22
1	2.67	Base	2.5	20–22
1 1/8	3.38	Base	2.5	20–22
1 1/4	4.17	Base	2.5	20–22
1 3/8	5.05	Base	2.5	20–22
1 1/2	6.01	Base	2.5	20–22
1 5/8	7.05	Base	2.5	20–22
1 3/4	8.18	Base	2.5	20–22
2	10.68	Base	2.5	20–22
2 1/4	13.52	Base	2.5	20–22
2 1/2	16.69	Base	2.5	20–22

ROUNDS

Tensile Strength	115/125,000 lbs. per sq. in.
Yield Point	95/110,000 lbs. per sq. in.
Elongation in 2″	16/20%
Reduction of Area	45/52%
Brinell (Average)	262/320

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Pound	Stock Lengths Feet
2 3/4	20.20	Base	2.5	20–22
3	24.03	Base	2.5	20–22
3 1/4	28.20	.10	2.5	20–22
3 1/2	32.71	.10	2.5	20–22
3 3/4	37.56	.15	2.5	20–22
4	42.73	.15	2.5	20–22

Warehouse Cutting Extras: Pages 298, 300-302.

ELASTUF S.A.E. 3140

CHROME NICKEL ALLOY MACHINERY STEEL

HEAT TREATED

ROUNDS

Tensile Strength	110/125,000 lbs. per sq. in.
Yield Point	85/100,000 lbs. per sq. in.
Elongation in 2"	16/20%
Reduction of Area	45/50%
Brinell (Average)	262/320

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Pound	Stock Lengths Feet
4¼	48.24	.25	2.5	20–22
4½	54.07	.25	2.5	20–22
4¾	60.25	.35	2.5	20–22

Warehouse Quantity Extras: Page 294.

Warehouse Cutting Extras: Pages 298, 300-302.

SPECIFICATION STEELS AND STEEL PRODUCTS

Send us your orders and inquiries for all special steel requirements such as:

- Navy Specifications
- Army Specifications
- Federal Specifications
- A.S.T.M. Specifications
- A.S.M.E. Specifications
- S.A.E. Specifications
- U. S. Steamboat Inspection
- American Bureau of Shipping Specifications
- American Welding Society Specifications
- Hartford Steam Boiler Inspection
- A.R.A. Specifications
- Individual Special Specifications

We have made a study of supplying steels to specifications in the most economical way. We are able to furnish all test reports and affidavits where needed and can take care of inspection by Governmental Agencies where required.

ELASTUF CHRO-MOLY
ALLOY MACHINERY STEEL
HEAT TREATED

Analysis: A Chrome Molybdenum Alloy Steel, with elements so proportioned as to give the best combination of physical properties and good machinability in the heat treated condition.

Sizes up to and incl. 4″ Rd.....35/.45 Car.
Sizes 4¼″ Rd. and Larger.....45/.55 Car.

Characteristics: ELASTUF CHRO-MOLY responds favorably to heat treatment, resulting in a steel of wide applicability, at moderate cost. In the heat treated condition it has a high yield-tensile ratio, it is readily machinable even in automatics, and has high impact values. It is not susceptible to temper brittleness, consequently the rate of cooling from drawing temperatures has little effect on the impact properties.

ELASTUF CHRO-MOLY retains its physical properties at elevated temperatures and fully meets A.S.T.M. Specification A-96-33, Class "C" for high temperature bolting material. This steel possesses marked creep strength or resistance to creep at high temperatures.

ELASTUF CHRO-MOLY has the maximum physical properties obtainable with this type of steel. The properties shown on the following page are not the average of a 1″ round sample, but are the actual physicals to be expected from the range of sizes shown.

First Cost: Assuming that a number of steels have physical properties that make them equally fit for a given service then, and only then—first cost becomes a matter well worth consideration. ELASTUF CHRO-MOLY Heat Treated is a steel of quite moderate cost.

Uses: The real value of a heat treated alloy steel is in the service obtained, with due consideration given first cost and fabrication expense. ELASTUF CHRO-MOLY Heat Treated has a wide range of applications for highly stressed parts where the physical properties of ELASTUF PENN Machinery Steel are insufficient and where the high strength and great toughness of ELASTUF TYPE A HEAT TREATED are not needed. A partial list of applications is: gears, pinions, shafts, axles, spindles, crank shafts, steering knuckles and arms, piston rods, oil well reamers, motor parts, etc. Because of its resistance to creep, this grade is excellent for high temperature and high pressure studs and bolts and other parts.

Machining: (Heat Treated Stock Bars) First cuts should be light to minimize warping and care should be taken to obtain the proper relation of feeds, speeds and cuts. It is necessary to reduce speeds and feeds as compared with straight carbon steels, ELASTUF PENN, or annealed Alloy Steels. Tool marks should be carefully avoided, keyways and all shoulders should be generously filleted.

Forgings: Special shapes can be supplied promptly, heat treated to standard or special requirements.

ELASTUF CHRO-MOLY
ALLOY MACHINERY STEEL
HEAT TREATED

ROUNDS

Tensile Strength	120/135,000 lbs. per sq. in.
Yield Point	110/120,000 lbs. per sq. in.
Elongation in 2″	18/22%
Reduction of Area	50/60%
Brinell (Average)	277/321

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Lb.	Stock Lengths Feet
½	.667	.20	2.5	20–22
⅝	1.04	.10	2.5	20–22
¾	1.50	Base	2.5	20–22
⅞	2.04	Base	2.5	20–22
1	2.67	Base	2.5	20–22
1⅛	3.38	Base	2.5	20–22
1¼	4.17	Base	2.5	20–22
1⅜	5.05	Base	2.5	20–22
1½	6.01	Base	2.5	20–22
1⅝	7.05	Base	2.5	20–22
1¾	8.18	Base	2.5	20–22
1⅞	9.39	Base	2.5	20–22
2	10.68	Base	2.5	20–22

Tensile Strength	120/135,000 lbs. per sq. in.
Yield Point	100/115,000 lbs. per sq. in.
Elongation in 2″	16/20%
Reduction of Area	50/60%
Brinell (Average)	277/321

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Lb.	Stock Lengths Feet
2⅛	12.06	Base	2.5	20–22
2¼	13.52	Base	2.5	20–22
2⅜	15.07	Base	2.5	20–22
2½	16.69	Base	2.5	20–22
2⅝	18.40	Base	2.5	20–22
2¾	20.20	Base	2.5	20–22
3	24.03	Base	2.5	20–22
3¼	28.20	.10	2.5	20–22
3½	32.71	.10	2.5	20–22
3¾	37.56	.15	2.5	20–22
4	42.73	.15	2.5	20–22

Tensile Strength	115/130,000 lbs. per sq. in.
Yield Point	95/115,000 lbs. per sq. in.
Elongation in 2″	16/20%
Reduction of Area	50/60%
Brinell (Average)	269/311

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Lb.	Stock Lengths Feet
4¼	48.24	.25	2.5	21–23
4½	54.07	.25	2.5	21–23
4¾	60.25	.35	2.5	21–23
5	66.76	.35	2.5	21–23
5¼	73.60	.45	2.5	21–23
5½	80.77	.45	2.5	21–23
5¾	88.29	.55	2.5	21–23
6	96.14	.55	2.5	21–23

Tensile Strength	110/130,000 lbs. per sq. in.
Yield Point	85/105,000 lbs. per sq. in.
Elongation in 2″	16/20%
Reduction of Area	50/60%
Brinell (Average)	245/302

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Lb.	Stock Lengths Feet
6¼	104.30	.65	2.5	21–23
6½	112.80	.65	2.5	21–23
6¾	121.70	.75	2.5	21–23

ELASTUF TYPE A
ALLOY MACHINERY STEEL
HEAT TREATED

Analysis: A special Chrome Vanadium Steel with elements so balanced as to give the most desirable and uniform combination of physical properties.

Rds. up to 2″ incl. .....
Sqs., Hexs. and Flats.....} Temper 14—.25/.35 Carbon

Rds. 2⅛″ and Larger.....Temper 9—.45/.55 Carbon

Characteristics: High Strength, great toughness, exceptional elasticity and wear resistance.

ELASTUF TYPE A in the heat treated condition meets the demand for a steel of maximum strength, which is at the same time machinable. It has more than three times the strength of soft steel, and is highly resistant to abrasion, shock and dynamic fatigue. Will withstand alternating and repeated impact stresses to a marked degree without fatigue failure.

ELASTUF TYPE A, Heat Treated, has the maximum physical qualities consistent with good machinability. This ease of machinability makes it valuable for many purposes requiring maximum strength, particularly where heat treatment after machining is neither feasible nor economical.

The high physicals of the heat treated stock are well illustrated by the figures given for each range of sizes on the following pages. These properties are not the average of a 1″ round sample, but are the actual physicals to be expected from the sizes shown.

ELASTUF TYPE A, Heat Treated, is particularly recommended for heavy duty shafts and axles carrying extreme loads and with exceptional heat, wear, shock and fatigue conditions present.

ELASTUF TYPE A
ALLOY MACHINERY STEEL
HEAT TREATED

Uses: Recommended for bolts and studs on high pressure and high temperature oil and steam lines; fan shafts, crank pins, conveyor shafts, steam shovel shafts, crusher roll shafts, pump drive shafts, dredging machine shafts, crank shafts, locomotive axles, propeller and armature shafts; bolts for textile machines, motor frames and gas retort doors, gears, worms, pinions, etc.

Forgings: Special shapes, large gear blanks, shafts, etc., can be supplied promptly, heat treated to requirements. Unless specified to the contrary, all forgings are heat treated to approximately 302/340 Brinell, in which condition they can be *machined and put into use without further heat treatment.*

ELASTUF TYPE A, Heat Treated, should not be welded by any method, nor should it be forged or heated above a dull red, as by so doing the beneficial properties resulting from heat treatment are lost.

Machining: (Heat Treated Stock Bars) Since high physicals are of prime importance, all stock bars, except annealed, are heat treated to produce maximum strength and still be machinable. By using somewhat reduced speeds and feeds, compared to those usual with untreated carbon steel, machining operations can be done on ELASTUF TYPE A, Heat Treated, without difficulty. In machining, first cuts should be light; to minimize warping. The tool should be so ground that it cuts "freely," thereby reducing frictional heat. The proper relation between feeds, speeds and cuts should be determined to get the best results. Smooth surfaces are essential; tool marks must be avoided. Keyway bottoms and all shoulders at changes in diameter should be generously filleted.

List of sizes carried in stock: Pages 140-142.
For ELASTUF TYPE A, Annealed, Temper No. 9: See Page 142.

ELASTUF TYPE A
ALLOY MACHINERY STEEL
ROUNDS

TEMPER No. 14—HEAT TREATED

Tensile Strength	125/135,000 lbs. per sq. in.
Yield Point	115/125,000 lbs. per sq. in.
Elongation in 2"	18/22%
Reduction of Area	57/64%
Brinell (Average) ⅜" to ⅞"	262/302
Brinell (Average) 1" to 2"	277/321

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Pound	Stock Lengths Feet
*¼	.166	1.25	2.5	10–12
*5/16	.261	1.00	2.5	10–12
*⅜	.36	.90	2.5	10–12
*7/16	.511	.70	2.5	10–12
½	.667	.20	2.5	20–22
⅝	1.04	.10	2.5	20–22
¾	1.50	Base	2.5	20–22
⅞	2.04	Base	2.5	20–22
1	2.67	Base	2.5	20–22
1⅛	3.38	Base	2.5	20–22
1¼	4.17	Base	2.5	20–22
1⅜	5.05	Base	2.5	20–22
1½	6.01	Base	2.5	20–22
1⅝	7.05	Base	2.5	20–22
1¾	8.18	Base	2.5	20–22
1⅞	9.39	Base	2.5	20–22
2	10.68	Base	2.5	20–22

*These sizes are Cold Finished.

TEMPER No. 9—HEAT TREATED

Tensile Strength	140/150,000 lbs. per sq. in.
Yield Point	120/135,000 lbs. per sq. in.
Elongation in 2"	16/20%
Reduction of Area	52/60%
Brinell (Average)	302/340

2⅛	12.06	Base	2.5	20–22
2¼	13.52	Base	2.5	20–22
2⅜	15.07	Base	2.5	20–22
2½	16.69	Base	2.5	20–22
2⅝	18.40	Base	2.5	20–22
2¾	20.20	Base	2.5	20–22
2⅞	22.07	Base	2.5	20–22
3	24.03	Base	2.5	20–22
3¼	28.20	.10	2.5	20–22
3½	32.71	.10	2.5	20–22
3¾	37.56	.15	2.5	20–22
4	42.73	.15	2.5	21–23

TEMPER No. 9—HEAT TREATED

Tensile Strength	145/160,000 lbs. per sq. in.
Yield Point	120/135,000 lbs. per sq. in.
Elongation in 2"	15/20%
Reduction of Area	42/52%
Brinell (Average)	302/340

4¼	48.24	.25	2.5	21–23
4½	54.07	.25	2.5	21–23
4¾	60.25	.35	2.5	21–23
5	66.76	.35	2.5	21–23
5¼	73.60	.45	2.5	21–23
5½	80.77	.45	2.5	21–23
5¾	88.29	.55	2.5	21–23
6	96.14	.55	2.5	21–23

Warehouse Quantity Extras: Page 294.
Warehouse Cutting Extras: Pages 298, 300-302.

ELASTUF TYPE A
ALLOY MACHINERY STEEL

TEMPER No. 9—HEAT TREATED

Tensile Strength	130/150,000 lbs. per sq. in.
Yield Point	105/125,000 lbs. per sq. in.
Elongation in 2"	15/20%
Reduction of Area	42/52%
Brinell (Average)	255/321

ROUNDS

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Heat Treated Extra Cents Per Pound	Stock Lengths Feet
6¼	104.30	.65	2.5	21–22
6½	112.80	.65	2.5	21–23
6¾	121.70	.75	2.5	21–23
7	130.80	.75	2.5	21–23
7½	150.20	.75	2.5	21–23
8	171.00	1.10	2.5	21–23

TEMPER No. 14—HEAT TREATED

Tensile Strength	125/135,000 lbs. per sq. in.
Yield Point	115/125,000 lbs. per sq. in.
Elongation in 2"	18/22%
Reduction of Area	57/64%
Brinell (Average)	277/321

SQUARES

¾	1.91	5.00	2.5	20–22
1	3.40	Base	2.5	20–22
1⅛	4.31	Base	2.5	20–22
1¼	5.31	Base	2.5	20–22
1½	7.65	Base	2.5	20–22
1¾	10.41	Base	2.5	20–22
2	13.60	Base	2.5	20–22

FLATS

½ x 1	1.70	5.00	2.5	20–22
1½	2.55	5.00	2.5	20–22
2	3.40	5.00	2.5	20–22
⅞ x 1¼	3.72	Base	2.5	20–22
1 x 1¼	4.25	Base	2.5	20–22
1½	5.10	Base	2.5	20–22
2	6.80	Base	2.5	20–22
3	10.20	5.00	2.5	20–22

TEMPER No. 14
COLD DRAWN and HEAT TREATED

Tensile Strength	125/135,000 lbs. per sq. in.
Yield Point	115/125,000 lbs. per sq. in.
Elongation in 2"	18/22%
Reduction of Area	59/64%
Brinell (Average)	277/321

HEXAGONS

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Cold Drawn Extra Cts. Per Pound	Heat Treated Extra Cts. Per Pound	Stock Lengths Feet
¾	1.66	.60	2.0	2.5	20–22
⅞	2.25	.55	2.0	2.5	20–22
1 1/16	3.30	.50	2.0	2.5	20–22
1¼	4.60	.45	2.0	2.5	20–22
1 7/16	6.09	.50	2.0	2.5	20–22
1⅝	7.78	.60	2.0	2.5	20–22
1 13/16	9.67	.60	2.0	2.5	20–22
2	11.78	.75	2.0	2.5	20–22
2⅜	16.61	1.00	2.0	2.5	20–22

Warehouse Quantity Extras: Page 294.

Warehouse Cutting Extras: Pages 298, 300-302.

ELASTUF TYPE A
ALLOY MACHINERY STEEL
ANNEALED

ANALYSIS: All stock sizes are .45/.55 Carbon. Unless otherwise specified, all sizes will be furnished in this carbon. In other respects analysis is the same as the heat treated stock.

GENERAL PURPOSES: For parts requiring physical properties beyond the range of machinability. In such cases ELASTUF TYPE A, Annealed, should be used, and hardened after machining. Recommended for clutches, cams, ratchets, clash gears, extra heavy duty bolts, forming dies, etc.

CHARACTERISTICS: It is possible to obtain hardness on ELASTUF TYPE A comparable with tool steel, but with considerably greater toughness. *Note previously quoted figures on Impact Strength.*
The use of ELASTUF TYPE A, Annealed, is indicated in preference to tool steel or carburized steel for many machine parts (not for cutting tools).

HEAT TREATMENT: Forge at 2200/2300° F.
Anneal at 1450/1500° F.
Harden at 1500/1600° F.—Oil Quench.
Draw to requirements. 300/350° F. will relieve quench strains and give maximum Torsional Impact Toughness.

DISTORTION: Due to carefully determined carbon and manganese content, ELASTUF TYPE A is remarkably free from distortion in hardening. This makes it useful for parts that are intricate, such as curved cams, moulds, mandrels, etc.

PHYSICAL PROPERTIES: (1″ Rd. Oil Quenched from 1550° F.)

Drawn ° F.	Brinell	Pounds per Square Inch Tensile Strength	Yield Point	Elongation in 2″ %	Reduction of Area %
800	461	225,000	206,000	10	38
1000	341	168,000	150,000	13	44
1200	262	132,000	112,000	18	55
(As Annealed 1″ Rd.)					
	201	100,000	72,000	27	58

The foregoing physical properties are typical of those obtained by heat treating ELASTUF TYPE A, Annealed, and should be considered as average.

ROUNDS

TEMPER No. 9—ANNEALED

Size Inches	Estimated Weight Per Foot	Net Extra For Size	Annealing Extra Cents Per Pound	Stock Lengths Feet
½	.668	.20	1.5	20–22
¾	1.502	Base	1.5	20–22
⅞	2.044	Base	1.5	20–22
1	2.67	Base	1.5	20–22
1⅛	3.38	Base	1.5	20–22
1¼	4.17	Base	1.5	20–22
1⅜	5.05	Base	1.5	20–22
1½	6.01	Base	1.5	20–22
1¾	8.18	Base	1.5	20–22
2	10.68	Base	1.5	20–22
2¼	13.52	Base	1.5	20–22
2½	16.69	Base	1.5	20–22
2¾	20.20	Base	1.5	20–22
3	24.03	Base	1.5	20–22

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

INDEX
OF
TOOL STEEL

Grades	Description (Pages)	Stock Sizes (Pages)
TROJAN	144	144-147
POTTS SOLID DRILL STEEL	145	145
CARPENTER TOOL STEELS	148	...
TOUGH TIMBRE TOOL STEEL	149	...
CARPENTER No. 11 EXTRA	150	151-153
CARPENTER MATCHED TOOL STEELS	154-162	...
No. 11 SPECIAL (Water-Hard)	163-166	167-169
SOLAR (Water-Tough)	170-173	174
K-W (Water-Wear)	175-179	180-181
STENTOR (Oil-Hard)	182-185	186-187
R. D. S. (Oil-Tough)	188-190	191
HAMPDEN (Oil-Wear)	192-195	196
No. 610	197	...
STAR-ZENITH HIGH SPEED (Red-Wear)	198-201	201-202
STAR-ZENITH BITS	203	203
GOLD STAR BITS	203	203
D. Y. O. (Red-Hard)	204-206	206
EXCELO (Red-Tough)	207-209	209

TROJAN TOOL STEEL

A quality steel of moderate price

Characteristics: Hardens well and is especially strong and tough. Welds and forges readily.

Uses: No. 8 Temper .75/.85 Carbon: Recommended for pick points, hand chisels, blacksmith, mine and quarry tools, fire tools and street tools (hand and pneumatic).

No. 9½ Temper .90/1.00 Carbon: Recommended for brake and forming dies, forging dies, and for a large variety of tools not requiring the quality of our higher grade steels.

Heat Treatment: Anneal at 1450 to 1500° F. (light cherry); harden at 1400 to 1500° F. (full cherry to light cherry), depending on size, shape and temper (carbon content). Water quench and temper at 350° F. to relieve strains. A higher draw will increase toughness and decrease hardness.

TROJAN TOOL STEEL

UNANNEALED

Temper No. 8

FLATS			ROUNDS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
¼x ¾	.64	10–12	¼	.17	10–12
1	.85	10–12	5/16	.26	10–12
1½	1.28	10–12	⅜	.36	10–12
2	1.70	10–12	7/16	.51	10–12
2¼	1.91	10–12	½	.67	10–12
			9/16	.85	10–12
⅜x1	1.28	10–12			
1¼	1.59	10–12	⅝	1.04	10–12
1½	1.92	10–12	11/16	1.27	10–12
1¾	2.23	10–12	¾	1.50	10–12
			13/16	1.76	10–12
½x ⅝	1.06	10–12	⅞	2.04	10–14
1	1.70	10–12	15/16	2.35	10–12
1¼	2.12	10–12			
1½	2.55	10–12	1	2.67	10–14
4½	7.65	10–12	1 1/16	3.01	10–12
			1⅛	3.38	10–14
⅝x1¼	2.65	10–12	1¼	4.17	10–14
1½	3.19	10–12	1⅜	5.02	10–12
			1½	6.01	10–12
¾x1	2.55	10–12			
1¼	3.19	10–12			
1½	3.83	10–12			
1¾	4.47	10–12			
1x1½	5.10	10–14			
1¾	5.95	10–14			

See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

TROJAN TOOL STEEL

UNANNEALED

Temper No. 8

SQUARES			OCTAGONS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
1/4	.21	10–12	3/16	.10	10–12
5/16	.33	10–12	1/4	.18	10–12
3/8	.48	10–12	5/16	.28	10–12
1/2	.85	10–12	3/8	.40	10–12
9/16	1.08	10–12	7/16	.54	10–12
			1/2	.70	10–12
5/8	1.33	10–12	9/16	.89	10–12
3/4	1.92	10–12			
7/8	2.60	12–14	5/8	1.10	12–14
			3/4	1.58	12–14
1	3.40	12–14	7/8	2.16	12–14
1 1/8	4.30	10–12	7/8	2.16	20–22
1 1/4	5.31	12–14	1	2.82	12–14
			1	2.82	20–22
1 1/2	7.65	10–12			
1 3/4	10.41	10–14	1 1/8	3.56	12–14
			1 1/8	3.56	20–22
2	13.60	10–12	1 1/4	4.40	12–14
2 1/2	21.25	10–12	1 1/4	4.40	20–22
			1 3/8	5.32	12–14
			1 1/2	6.34	12–14
			1 1/2	6.34	20–22
			1 5/8	7.32	12–14
			1 3/4	8.64	12–14
			2	11.28	12–14

UNANNEALED

HEXAGONS—Temper No. 8

7/8	2.25	20–22	1 1/8	3.73	20–22
1	2.94	20–22	1 1/4	4.60	20–22

See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

POTTS SOLID DRILL STEEL

HEXAGONS—Temper No. 8

7/8	2.25	20–22	1 1/8	3.73	20–22
1	2.94	20–22	1 1/4	4.60	20–22

HOLLOW DRILL STEEL may be had promptly from stock in all sizes.

iladelphia
Gent 7450
ark 5351
altimore
rnon 8260

Philadelph
REGent 74
Park 535

Baltimore
Vernon 8260

TROJAN TOOL STEEL
ANNEALED
Temper No. 9½

FLATS			FLATS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
½x ⅝	1.06	11–13	1¼x2¾	11.69	11–13
¾	1.28	11–13	3	12.75	11–13
1	1.70	11–13	3¼	13.81	11–13
1¼	2.12	11–13	3½	14.87	11–13
1½	2.55	11–13	4	17.00	11–13
2	3.40	11–13	4½	19.13	11–13
2½	4.25	11–13	5	21.25	11–13
3	5.10	11–13	6	25.50	11–13
4	6.80	11–13			
			1½x2	10.20	11–13
⅝x ¾	1.60	11–13	2¼	11.48	11–13
1	2.13	11–13	2½	12.75	11–13
1¼	2.65	11–13	2¾	14.04	11–13
1½	3.19	11–13	3	15.30	11–13
1¾	3.72	11–13	3¼	16.58	11–13
2	4.25	11–13	3½	17.85	11–13
2½	5.31	11–13	4	20.40	11–13
3	6.38	11–13	4½	22.95	11–13
			5	25.50	11–13
¾x1	2.55	11–13	6	30.60	11–13
1¼	3.19	11–13	7	35.70	11–13
1½	3.83	11–13	8	40.80	11–13
1¾	4.47	11–13			
2	5.10	11–13	1¾x2	11.90	11–13
2¼	5.75	11–13	2¼	13.40	11–13
2½	6.38	11–13	2½	14.88	11–13
3	7.65	11–13	2¾	16.37	11–13
3½	8.93	11–13	3	17.85	11–13
4	10.20	11–13	3½	20.83	11–13
4½	11.48	11–13	4	23.80	11–13
5	12.75	11–13	4½	26.78	11–13
6	15.30	11–13	5	29.75	11–13
			6	35.70	11–13
1 x1¼	4.25	11–13			
1½	5.10	11–13	2 x2½	17.00	11–13
1¾	5.95	11–13	3	20.40	11–13
2	6.80	11–13	3½	23.80	11–13
2½	8.50	11–13	4	27.20	11–13
3	10.20	11–13	4½	30.60	11–13
3½	11.90	11–13	5	34.00	11–13
4	13.60	11–13	5½	37.40	11–13
4½	15.30	11–13	6	40.80	11–13
5	17.00	11–13	7	47.60	11–13
5½	18.70	11–13	8	54.40	11–13
6	20.40	11–13			
7	23.80	11–13	2½x3	25.50	11–13
8	27.20	11–13	3½	29.75	11–13
			4	34.00	11–13
1¼x1½	6.38	11–13	4½	38.25	11–13
1¾	7.44	11–13	5	42.50	11–13
2	8.50	11–13	5½	46.75	11–13
2¼	9.57	11–13	6	51.00	11–13
2½	10.62	11–13	7	59.50	11–13
			8	68.00	11–13

See Tool Steel Extras for
Annealing, page 294.
Size, page 292.
Quantity, page 294.
Cutting, page 296.

TROJAN TOOL STEEL

ANNEALED

Temper No. 9½

FLATS			ROUNDS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
3 x3½	35.70	11–13	½	.67	10–12
4	40.80	11–13	⅝	1.04	10–12
4½	45.90	11–13	¾	1.50	10–12
5	51.00	11–13	⅞	2.05	10–12
5½	56.10	11–13			
6	61.20	11–13	1	2.67	10–12
7	71.40	11–13	1⅛	3.38	10–12
8	81.60	11–13	1¼	4.17	10–12
			1⅜	5.05	10–12
3½x4	47.60	11–13	1½	6.01	10–12
4½	53.55	11–13	1⅝	7.05	10–12
5	59.50	11–13	1¾	8.18	10–12
5½	65.45	11–13	1⅞	9.39	10–12
6	71.40	11–13			
7	83.30	11–13	2	10.68	10–12
8	95.20	11–13	2⅛	12.06	10–12
			2¼	13.52	10–12
4 x4½	61.20	11–13	2½	16.69	10–12
5	68.00	11–13	2¾	20.20	10–12
5½	74.80	11–13			
6	81.60	11–13	3	24.00	10–12
7	95.20	11–13	3¼	28.20	10–12
8	108.80	11–13	3½	32.70	10–12
			3¾	37.55	10–12
4½x5	76.50	11–13			

SQUARES			SQUARES		
½	.85	11–13	1¾	10.41	11–13
⅝	1.33	11–13			
¾	1.92	11–13	2	13.60	11–13
⅞	2.61	11–13	2¼	17.22	11–13
			2½	21.25	11–13
1	3.40	11–13	2¾	25.00	11–13
1⅛	4.31	11–13			
1¼	5.31	11–13	3	30.60	11–13
1⅜	6.43	11–13	3½	41.65	11–13
1½	7.65	11–13			
			4	54.40	11–13

See Tool Steel Extras for
Annealing, page 294.
Size, page 292.
Quantity, page 294.
Cutting, page 296.

Philadelphia
Gent 7450
Park 5351
Baltimore
Lexington 8260

CARPENTER TOOL STEELS

As Warehouse Distributors for The Carpenter Steel Co., Reading, Pa., we are able to give the most complete Tool Steel Service.

Stock sizes, as shown by the following pages, are immediately available either from our warehouse or from the Carpenter warehouses.

Grades and sizes not listed can be obtained promptly from the Mill.

The working arrangement between Carpenter and ourselves puts at the disposal of all our customers both the carefully trained men from our own Tool and Alloy Division and the complete Sales and Metallurgical Departments of The Carpenter Steel Co. This combined Warehouse and Mill service we believe is of superlative value to every user of Tool Steel.

Increasing demands on productive tools make imperative the utmost specialization in the steels used in their manufacture.

All tool steels are subject to manufacturers' standard classification of extras for size, quantity, annealing, cutting, etc. Extra List will be furnished on request.

THE CARPENTER STEEL COMPANY has pioneered in the development of Carbon Tool Steels of most remarkable characteristics, chief of which is the well known Tough Timbre. This, combined with Acid Etch Disc Inspection, is of utmost importance to tool steel users.

CARPENTER TOOL STEELS

"TOUGH TIMBRE TOOL STEEL"

THIS STEEL HAS BEEN
DISC-INSPECTED
BY ACID ETCH AND BY HARDENING
THE CARPENTER STEEL CO. — READING, PA.
WARRANTED CLEAN DIOK SOUND UNIFORM

The Carpenter Steel Company has developed processes of manufacture, testing and inspection which have resulted in tool steels of surpassing quality.

The expression "Tough Timbre Tool Steel" was at first thought to be an indefinable quality that could only be obtained in the laboratory. Shop results, however, have been so excellent that now the tool steel user has at his disposal steels of quality heretofore unknown.

"Tough Timbre" in water-hardening carbon tool steel means that it is difficult to crack in hardening, difficult to check in grinding, and difficult to ruin in service. Furthermore, it means that every bar will harden alike, show the same penetration of hardness, the same expansion or contraction in hardening and must have the same ability to perform in service.

The Acid Etch is the most dependable method of securing tool steel that is free from center sponginess, slag inclusions and other imperfections that so frequently result in broken tools, after all the labor has been spent.

Carpenter Tough Timbre Tool Steel is warranted clean, sound and uniform, having been subjected to the acid etch inspection. All bars carry the DIOK label, meaning "Disc Inspected O.K."

Due to the continued brilliant research work done by Carpenter, it is now possible to measure the toughness of hardened tool steel. This is done on what is known as the Torsion Impact machine, developed by Carpenter. It has proven of great value to the tool steel user. It has indicated proper methods of heat treatment and has enabled the heat treater to improve the service life of tools; it has shown, for instance, the effect of different hardening temperatures, different drawing temperatures, different furnace atmospheres, etc., on the toughness of hardened tool steel. There is a temperature for drawing that gives the maximum torsional impact strength and this figure is a guide to the service life of a tool.

The Carpenter Steel Company is producing tool steels of unusually high quality, which means that the user can confidently trust any job, no matter how difficult, to a Carpenter Tool Steel.

These steels are stocked, serviced and sold by us, and we offer our complete facilities to the tool steel user.

Philadelphi
REGent 745
Park 5351

Baltimore
Vernon 826

CARPENTER No. 11 EXTRA

(Water-Hardening)

TOOL STEEL

CHARACTERISTICS: A general purpose water hardening tool steel manufactured with special attention to quality and uniform hardening properties. Every bar bears the DIOK label—meaning "Disc Inspection O.K." It is also Tough Timbre and Hardenability Tested.

USES: Blanking, punching, shearing and forming dies, shear blades, broaches, counter bores, coping knives, jewelers' dies, steel stamps, milling cutters, punches, dies, taps, reamers, etc.

HEAT TREATMENT: The extensive research work done on water-hardening tool steel by The Carpenter Steel Company has resulted in the production of steels possessing remarkable response to heat treatment. This is manifest in the lessened tendency to crack or be brittle in the hardened condition. These characteristics result in what is acclaimed "Tough Timbre Tool Steel."

To Anneal: At approximately 1400° F., cool slowly.

To Harden: Heat slowly and uniformly in a neutral or slightly oxidizing atmosphere to 1450° F. and quench in 5% to 10% salt brine. Brine is much better than fresh water for all water-hardening tool steels. For maximum combination of hardness and toughness, draw at 350° to 375° F.

The following table shows the effect of drawing at various temperatures:

EFFECT OF DRAWING TEMPERATURE ON HARDNESS

No. 11 Extra—Brine Quenched from 1450° F.—Drawn One Hour

Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope
As hardened	C-66/67	96
200° F.	66/67	96
300° F.	64/65	92
350° F.	**63/64**	**90**
375° F.	62/63	88
400° F.	61/62	86
500° F.	58/59	82
600° F.	54/55	74
700° F.	50/51	68
800° F.	46/47	62

Sizes carried in stock—pages 151-153.

CARPENTER No. 11 EXTRA

(Water-Hardening)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Length Feet
⅛x ½	.21	10–12
⅝	.27	10–12
¾	.32	10–12
⅞*	.37	10–12
1	.43	10–12
1¼	.53	10–12
1½	.64	10–12
2	.85	10–12
2½	1.06	10–12
3/16 x½	.32	10–12
¾	.48	10–12
⅞	.56	10–12
1	.64	10–12
1¼	.80	10–12
1½	.96	10–12
2	1.28	10–12
2½	1.59	10–12
3	1.91	10–12
¼x ½	.43	10–12
⅝	.53	10–12
¾	.64	10–12
1	.85	10–12
1¼	1.06	10–12
1½	1.28	10–12
2	1.70	10–12
2½	2.13	10–12
3	2.55	10–12
6*	5.10	10–12
⅜x ½	.64	10–12
⅝	.80	10–12
¾	.96	10–12
⅞*	1.12	10–12
1	1.28	10–12
1¼	1.59	10–12
1½	1.91	10–12
1¾*	2.23	10–12
2	2.55	10–12
2½	3.19	10–12
3	3.83	10–12
3½*	4.46	10–12
4	5.10	10–12
½x ⅝*	1.06	10–12
¾	1.28	10–12
⅞	1.49	10–12
1	1.70	10–12
1¼	2.13	10–12

FLATS

Size Inches	Estimated Weight Per Foot	Stock Length Feet
½x1½	2.55	10–12
1¾	2.98	10–12
2	3.40	10–12
2½	4.25	10–12
3	5.10	10–12
3½	5.95	10–12
4	6.80	10–12
4½*	7.65	10–12
5	8.50	10–12
6*	10.20	10–12
⅝x ¾*	1.59	10–12
⅞*	1.86	10–12
1	2.13	10–12
1⅛*	2.39	10–12
1¼	2.66	10–12
1½	3.19	10–12
1¾*	3.72	10–12
2	4.25	10–12
2¼*	4.78	10–12
2½	5.31	10–12
2¾*	5.84	10–12
3*	6.38	10–12
3½*	7.44	10–12
4*	8.50	10–12
5*	10.63	10–12
¾x1	2.55	10–12
1¼	3.19	10–12
1½	3.83	10–12
1¾	4.46	10–12
2	5.10	10–12
2¼	5.74	10–12
2½	6.38	10–12
2¾*	7.01	10–12
3	7.65	10–12
3½	8.93	10–12
4	10.20	10–12
4½*	11.48	10–12
5	12.75	10–12
6	15.30	10–12
⅞x1*	2.98	10–12
1¼*	3.72	10–12
1⅜*	4.09	10–12
1½*	4.46	10–12
2*	5.95	10–12
2½*	7.44	10–12
3*	8.93	10–12
3½*	10.41	10–12

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

iladelphia
Cent 7450
ark 5351
altimore
rnon 8260

DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphi
RECent 745
Park 5351

Baltimore
Vernon 826

CARPENTER No. 11 EXTRA

(Water-Hardening)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
⅞x3¾*	11.16	10–12
4½*	13.39	10–12
5*	14.88	10–12
1 x1¼	4.25	10–12
1½	5.10	10–12
1¾	5.95	10–12
2	6.80	10–12
2¼*	7.65	10–12
2½	8.50	10–12
3	10.20	10–12
3½	11.90	10–12
3¾*	12.75	10–12
4	13.60	10–12
4½	15.30	10–12
5	17.00	10–12
5½	18.70	10–12
6	20.40	10–12
7	23.80	10–12
8*	27.20	10–12
1¼x1½	6.38	10–12
1¾	7.44	10–12
2	8.50	10–12
2¼	9.56	10–12
2½	10.63	10–12
3	12.75	10–12
3¼*	13.81	10–12
3½	14.88	10–12
4	17.00	10–12
4½	19.13	10–12
5	21.25	10–12
6	25.50	10–12
7*	29.75	10–12
8	34.00	10–12
1½x2	10.20	10–12
2¼	11.48	10–12
2½	12.75	10–12
2¾	14.03	10–12
3	15.30	10–12
3½	17.85	10–12
4	20.40	10–12
4½	22.95	10–12
5	25.50	10–12
5½	28.05	10–12
6	30.60	10–12
7	35.70	10–12
8	40.80	10–12

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
1¾x2	11.90	10–12
2¼*	13.39	10–12
2½	14.88	10–12
2¾*	16.36	10–12
3	17.85	10–12
3½*	20.83	10–12
4	23.80	10–12
4½	26.78	10–12
5	29.75	10–12
6	35.70	10–12
2 x2¼*	15.30	10–12
2½	17.00	10–12
2¾*	18.70	10–12
3	20.40	10–12
3½	23.80	10–12
4	27.20	10–12
5	34.00	10–12
6	40.80	10–12
7	47.60	10–12
8*	54.40	10–12
2¼x2¾*	21.04	10–12
3½*	26.78	10–12
4*	30.60	10–12
2½x3	25.50	10–12
3½	29.75	10–12
4	34.00	10–12
4½	38.25	10–12
5	42.50	10–12
6	51.00	10–12
7*	59.50	10–12
2¾x3½*	32.73	10–12
3 x3½*	35.70	10–12
4	40.80	10–12
4½*	45.90	10–12
5*	51.00	10–12
6*	61.20	10–12
3½x5*	59.50	10–12
6*	71.40	10–12
4 x5*	68.00	10–12

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for
Annealing, page 294.
Size, page 292.
Quantity, page 294.
Cutting, page 296.

CARPENTER No. 11 EXTRA

(Water-Hardening)

TOOL STEEL—ANNEALED

ROUNDS

Size Inches	Estimated Weight Per Foot	Stock Length Feet
1/4	.17	10–12
5/16	.26	10–12
3/8	.38	10–12
13/32*	.44	10–12
7/16	.51	10–12
1/2	.67	10–12
9/16	.85	10–12
5/8	1.04	10–12
11/16	1.26	10–12
23/32*	1.38	10–12
3/4	1.50	10–12
13/16*	1.76	10–12
7/8	2.04	10–12
15/16*	2.35	10–12
1	2.67	10–12
1 1/16*	3.01	10–12
1 1/8	3.38	10–12
1 3/16*	3.77	10–12
1 1/4	4.17	10–12
1 5/16*	4.60	10–12
1 3/8	5.05	10–12
1 7/16*	5.52	10–12
1 1/2	6.01	10–12
1 5/8	7.05	10–12
1 3/4	8.18	10–12
1 7/8	9.39	10–12
2	10.68	10–12
2 1/8	12.06	10–12
2 1/4	13.52	10–12
2 3/8	15.06	10–12

ROUNDS

Size Inches	Estimated Weight Per Foot	Stock Length Feet
2 1/2	16.69	10–12
2 5/8	18.40	10–12
2 3/4	20.20	10–12
2 7/8*	22.07	10–12
3	24.03	10–12
3 1/8*	26.08	10–12
3 1/4	28.21	10–12
3 3/8*	30.42	10–12
3 1/2	32.71	10–12
3 5/8*	35.09	10–12
3 3/4	37.55	10–12
4	42.73	10–12
4 1/8*	45.44	10–12
4 1/4	48.23	10–12
4 3/8*	51.11	10–12
4 1/2	54.08	10–12
4 3/4	60.25	10–12
5	66.76	10–12
5 1/4	73.60	10–12
5 1/2	80.78	10–12
6	96.13	10–12
6 1/4	104.31	10–12
6 1/2	112.82	10–12
7	130.85	10–12
7 3/4*	160.39	10–12
8	170.90	10–12

SQUARES

1/4	.21	10–12
5/16	.33	10–12
3/8	.48	10–12
7/16*	.65	10–12
1/2	.85	10–12
5/8	1.33	10–12
3/4	1.91	10–12
7/8	2.60	10–12
1	3.40	10–12
1 1/8	4.30	10–12
1 1/4	5.31	10–12
1 3/8	6.43	10–12

SQUARES

1 1/2	7.65	10–12
1 5/8*	8.98	10–12
1 3/4	10.41	10–12
2	13.60	10–12
2 1/4	17.21	10–12
2 1/2	21.25	10–12
2 3/4	25.71	10–12
3	30.60	10–12
3 1/4*	35.91	10–12
3 1/2	41.65	10–12
4	54.40	10–12

*Sizes thus marked Reading, Pa., stock.

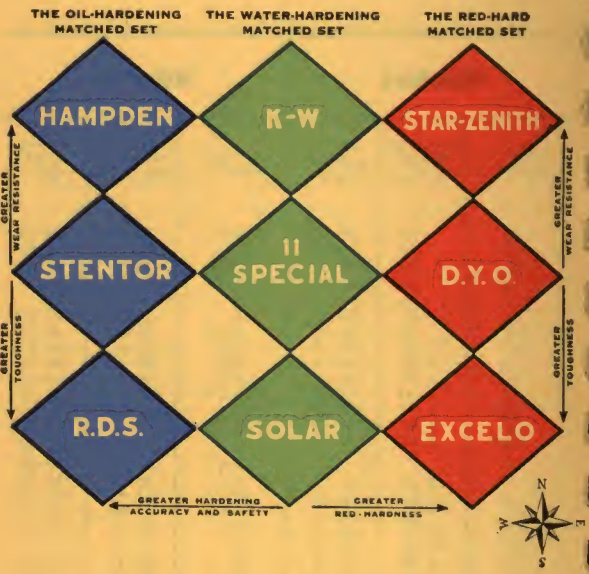
See Tool Steel Extras for
Annealing, page 294.
Size, page 292.
Quantity, page 294.
Cutting, page 296.

Philadelphi
REGent 745
Park 5351

Baltimore
Vernon 826

CARPENTER MATCHED TOOL STEELS

Carpenter Matched Tool Steels are a group of nine tool steels, represented by the nine diamonds shown below.



These nine steels will solve practically any tool problem that can come up in the tool room.

They are called "Matched Tool Steels" because each one picks up its job where the other leaves off. They dove-tail so closely together that you can know in advance what the results will be as you switch from one steel to another.

The key steel is the one in the center—*No. 11 Special.* This is a 1.10% carbon, water-hardening tool steel.

HOW THE DIAGRAM IS USED

When you have a tool to make, you ask yourself: "Should I make this tool from *No. 11 Special?*" Many times the answer will be: "Yes." In that case, you of course go no further. But suppose the answer is: "No," what then? You then ask the second question: "Why not?"

There can be only four answers to the second question, and on the Matched Diagram each answer is assigned to one point of the compass—north, south, east and west. Here are the four answers.

Answer No. 1: "Because greater wear resistance is needed."

This is a perfectly good answer—perhaps the tool in question **could** be made of *No. 11 Special* but it must run day after day and you want to get maximum wear resistance so that the production per dressing will be as great as possible.

On the Matched Diagram you always get more wear resistance by travelling **north.** Immediately north of *No. 11 Special* is *K-W*. *K-W* is a water-hardening alloy tool steel very much like *No. 11 Special* excepting that it will wear from four to ten times as long. So, in this case, you make the tool of *K-W*.

Answer No. 2: "Because greater toughness is required."

Some tools like shear blades, chisels, boiler punches, spring collets, etc., require more toughness than you get in a high carbon steel like *No. 11 Special*.

On the Matched Diagram you always travel **south** to get greater toughness. Directly south of *No. 11 Special* you come to *Solar*. This is another water-hardening alloy steel, much like *No. 11 Special* excepting that it is many times tougher. Therefore, you make these tough tools of *Solar*.

> NOTE: When you travel **north** to secure greater wear resistance, you are going **away from toughness,** which is in the south. Hence, *K-W* is not as tough as *No. 11 Special*.
>
> Also, when you travel **south** for greater toughness, you are travelling **away from wear resistance,** which is up north. Hence, *Solar* is not as wear resisting as *No. 11 Special*.

Answer No. 3: "Because greater hardening accuracy and safety are needed than can be expected of a water-hardening tool steel."

Many tools cannot be ground after hardening and must accurately hold their shape. Also, some tools are so intricate in their shape that they might crack if quenched in water.

On the Matched Diagram, hardening accuracy and safety are found in the **west**. So you proceed west from *No. 11 Special* and come to *Stentor*. *Stentor* is an oil-hardening alloy tool steel that is used for just about the same line of tools as *No. 11 Special*—excepting that it is safer to harden and holds its size and shape more accurately during the quench.

Answer No. 4: "The tool gets hot in service and *No. 11 Special* would lose its temper."

Many tools such as high speed cutting tools, and tools for hot forging, hot extruding, hot molding, etc., reach a degree of temperature in service that will soften a plain carbon tool steel.

On the Matched Diagram, red hardness is found in the **east.** Directly east from *No. 11 Special* is *D. Y. O.* steel. This is a high tungsten alloy steel that is scarcely affected at all by temperatures as high as 1200° F. This is therefore the direction to go in response to Answer No. 4.

CARPENT MATCHED METHOD
NO. 11 SPECIAL
SOLAR
K-W
STENTOR
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND
T RESISTIN
STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphi
REGent 745
Park 5351

Baltimore
Vernon 826

Thus, the four points of the compass take care of the only four possible answers to the question "Why not use *No. 11 Special?*"

There are literally hundreds of tools that **can** be and **should** be made from *No. 11 Special.* This steel forms the starting point for all of your thinking. The Matched Diagram provides four positive directions in which you can go to secure additional properties beyond those possessed by *No. 11 Special.*

Sometimes the tool maker wants two things at once. For example, he might want greater wear resistance **and also** greater hardening accuracy. If so, he travels north for wear resistance and west for accuracy and comes to *Hampden.*

Similarly, he might want greater toughness and hardening accuracy at the same time in which case he would travel south and then west and come to *R. D. S.*

If he wanted maximum hardness and wear resistance in a red hard steel, he would travel east and north and arrive at *Star-Zenith* High Speed Steel.

To get red hardness with maximum toughness, he would travel east and south to use *Excelo.*

Due to the matched relationship between these nine steels, a tool maker who is familiar with any **one** of them can move into the adjoining diamonds and forecast his results with considerable accuracy. Thus, he gradually becomes acquainted with the entire set.

THE KEY STEEL

No. 11 Special is the most important member of the entire set. It will do more jobs than any other steel, it is the easiest steel to machine, easy to harden and will average to make less expensive tools than the higher alloyed materials which surround it. Therefore, a tool maker should never travel away from this steel unless it is necessary.

No. 11 Special is a **Tough Timbre** tool steel. Timbre is the property of high carbon, water-hardening tool steel that controls the grain size and penetration of hardness. It has nothing to do with the chemical analysis of the steel.

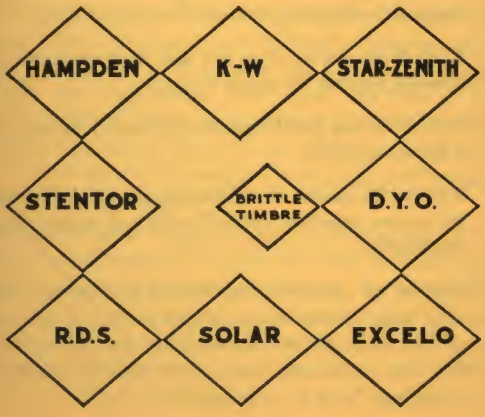
The **Tough Timbre** kind will withstand accidental overheat in hardening without damage; it is much less likely to crack in hardening; and it makes tougher and stronger tools without sacrifice of hardness. For further details, ask for our book "Tough Carbon Tool Steel," which describes Timbre and how it affects tools made from carbon tool steel.

If you have been using some high carbon water-hardening tool steel other than *No. 11 Special,* you cannot appreciate the many tools that can be made from this **Tough Timbre** steel. *No. 11 Special* is as different from the old fashioned water-hardening tool steels as a modern tire is different from the old fashioned tires. We used to brag about the tires that gave us 4,000 miles of service—but at that time we had not been spoiled by anything better. Today no one would tolerate a low mileage tire.

Just so, many tool makers do not realize what can be done with a **Tough Timbre** water-hardening tool steel because they are still using the old kind. Quite a few of these men have practically abandoned water-hardening tool steels in favor of alloy steels—just because they found the old fashioned water-hardening tool steels so undependable. As a result of this "flight from carbon tool steel," they now say that they are not having any trouble with their water-hardening tool steel—but really this is because they give it only the most unimportant jobs to do.

There is now a definite movement **back** to water-hardening tool steels because tool makers have found in **Tough Timbre** steel a means for safely returning to the easy machining, the glass hard surface and the clean cutting efficiency of a water-hardening steel.

If you were using the old fashioned "brittle timbre" carbon tool steel, your Matched Diagram would look like this.



iladelphia
Gent 7450
ark 5351
altimore
rnon 8260
NO. 11 SPECIAL
SOLAR
K-W
STENTOR
R. D. S
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphi
REGent 745
Park 5351

Baltimore
Vernon 826

"Brittle timbre" steel covers so little territory that it can be used for only a small number of tools and the tool maker is very frequently called upon to reach out for some alloy steel. Due to its limitations, brittle timbre is not matched with the steels that surround it—there are gaps between. For example, the brittleness of brittle timbre steel might drive a tool maker south toward *Solar*. After the tool was made of *Solar* it might lack sufficient wear resistance for its purpose. What would he do then?

It is evident that this particular tool falls in the open space between brittle timbre steel and *Solar*. The only recourse would be to hunt **outside** the Matched Diagram for some other steel to fill the gap. This defeats the very purpose of the Diagram which is to use the smallest possible number of steels and have them so closely matched that you can go from one to the other without any gaps. To use the Carpenter Diagram with **other** steels substituted here and there is dangerous business. Every time you do this you are almost sure to break up your Matched Set and get awkward spaces that will have to be filled with some other unmatched steels. Ultimately you get right back to a big assortment of steels—each of which is good for only a few jobs and you have lost the advantages of the Matched Set principle.

ADVANTAGES OF USING MATCHED TOOL STEELS

The advantages of using Matched Tool Steels are these:

1. It enables the tool maker to select the proper type of tool steel for each job.

2. If a certain grade of steel fails to meet the requirements of a tool, the tool maker knows exactly which steel to pick to correct the trouble.

3. The group totals only nine steels—and many tool makers do not even need to use all of these. This makes for simplification in the tool room.

4. Tool Steel inventories are less because there are a smaller number of steels to use.

5. Heat treating problems are minimized by using only a few tool steels.

6. The performance of finished tools will be increased by proper selection of tool steels and simplified heat treatment.

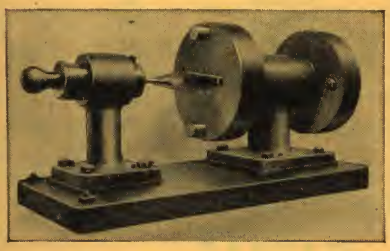
7. Best of all—the tool maker does not have to depend to a large extent upon outside advice in the choice of his tool steels or the solution of his steel problems. He does it himself and knows exactly **what** he is doing and **why** he is doing it.

SIMPLIFIED HEAT TREATMENT

The heat treatment of Carpenter Matched Tool Steels has been simplified beyond anything previously known.

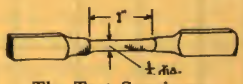
A tool must be hard enough to resist wear, and tough enough to avoid breaking. We have never had much trouble measuring the **hardness** of a tool steel, but it has been practically impossible to measure its **toughness.** For this reason, it has always been necessary to do a lot of cutting-and-trying in order to find the heat treatment that would give the best combination of hardness and toughness.

About five years ago there was developed in Carpenter's Research Laboratory a testing machine that would measure the toughness of hardened tool steel. This machine is known as the "Carpenter Torsion Impact Testing Machine" and is now manufactured and sold as a standard testing machine by the Baldwin-Southwark Corporation, Philadelphia, Pennsylvania.



The first Torsion Impact Machine.

A test piece is machined to the shape shown at the right. It is heat treated, and then broken in the testing machine by a torsional impact blow. The force required to break it is measured in "foot-pounds." One foot-pound is the blow struck by a one pound weight falling one foot. Ten foot-pounds would be the energy of a ten pound weight falling one foot (or a one pound weight falling ten feet).



The Test Specimen.

Now suppose we had a plain high carbon, water-hardening tool steel and wanted to know what drawing temperature should be used to secure the best combination of hardness and toughness. We would machine a lot of torsion impact test pieces, harden them all exactly the same way and then draw them all at different temperatures. When we measure their hardness and toughness, we get the figures tabulated on page 160.

Observe that the toughness as quenched is only 26 foot-pounds, but it increases rapidly to over 120 foot-pounds as the drawing temperature is raised to 350°/375° F. Then, strange as it seems, the toughness falls off rapidly again at higher drawing temperatures until it is less than half the "peak" value. Upon drawing above 500° F. the values increase again.

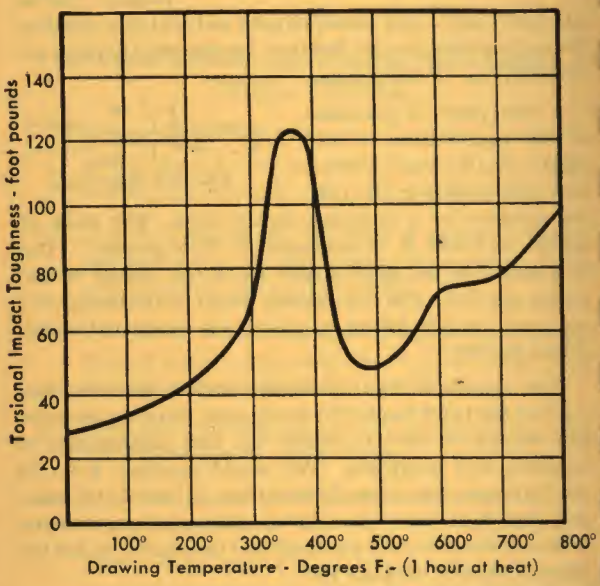
Philadelph
REC ent 74
Park 535
Baltimore
Vernon 82

Average Hardness and Toughness of 1.10% Carbon Tool Steel, Water Quenched from 1450° F.

Drawing Temperature 1 hour at heat	Rockwell Hardness	Torsional Toughness
No draw	C-66.8	26 ft. lbs.
275° F.	C-65.8	60
325° F.	C-65.0	109
350° F.	C-64.0	122
375° F.	C-63.0	122
400° F.	C-62.2	111
425° F.	C-61.2	66
450° F.	C-60.2	54
475° F.	C-59.8	50
525° F.	C-57.8	52
575° F.	C-56.0	64
600° F.	C-54.7	73
650° F.	C-52.0	75
700° F.	C-49.6	78
800° F.	C-46.0	98

When the above toughness figures are plotted on a curve they look like this:

Effect of Drawing Temperature on Toughness



Hundreds of these toughness curves have been made and every hard tool steel that has been tested shows either one or two of these toughness "peaks." Practical experience over a period of about three years in commercial tool rooms proves that in a vast majority of cases, the best results are secured from tools drawn at this toughness "peak."

There seem to be just enough exceptions "to prove the rule." Every now and then we get reports of tools that appear to give better service when drawn higher than the toughness "peak." The reason for these exceptions is not known, but it is doubtless due to something unusual in the size, or shape, or service of the tool.

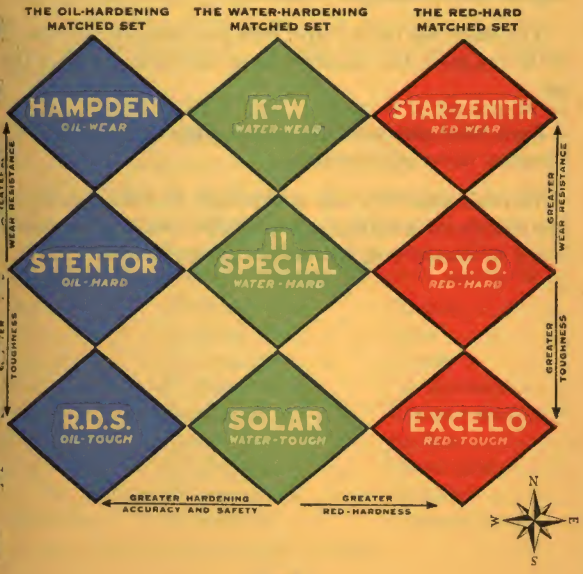
Throughout this manual, we will give the torsional impact curve for each tool steel in the Water-Hardening and Oil-Hardening Matched Sets. In the tables of drawing temperature, the temperature corresponding to the toughness "peak" is emphasized. In the Red-Hard Matched Set, torsional impact curves are not given because these steels operate at elevated temperatures where toughness figures are not yet available. In drawing these three Red-Hard steels, we usually aim for the **secondary hardness peaks,** where maximum red-hardness is secured.

If you will always start out using these preferred temperatures, you will eliminate a tremendous amount of cutting-and-trying, and will greatly improve the average performance of your tools.

NAMING THE MATCHED STEELS

The Carpenter Steel Company has always used brand names for their tool steels. These names are well known to our customers and have acquired a definite meaning in thousands of plants.

To assist in remembering and placing these nine steels on the Matched Diagram we have given to each one a new subsidiary name. These new names are shown in the diagram below along with the regular brand names.



iladelphia
Gent 7450
ark 5351
altimore
rnon 8260
NO. 11 SPECIAL
SOLAR
K-W
STENTOR
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphi
REGent 74
Park 5351

Baltimore
Vernon 826

For example, *Hampden* Steel is the **wear resisting** member of the **Oil-Hardening** Matched Set. We, therefore, name it "OIL-WEAR."

Stentor, which is the intermediate steel in the Oil-Hardening Set, will be called "OIL-HARD."

R. D. S. is the **tough** member of the Oil-Hardening Matched Set and will therefore be called "OIL-TOUGH."

In the **Water-Hardening** Matched Set, *K-W* is called "WATER-WEAR." *No. 11 Special* is called "WATER-HARD." *Solar* is called "WATER-TOUGH."

In the **Red-Hard** Matched Set, *Star-Zenith* is "RED-WEAR"; *D. Y. O.* is "RED-HARD"; *Excelo* is "RED-TOUGH."

These are new trade-marked names of the Carpenter Matched Tool Steels. In ordering any of these steels or in writing about them, our customers can use either of the two names and no confusion will result either at the mill or in our Branch Warehouses. "*Solar*" and "WATER-TOUGH" are simply two different names for the same thing—just like "Napoleon" and "Bonaparte" are two names for the same individual.

LABELS

The label attached to each bar of Matched Tool Steel when it is shipped is reproduced in color on the following pages as each Matched Tool Steel is individually described.

You will note that the labels for all of the oil-hardening steels are **blue,** the water-hardening steels are **green,** and the red-hard steels are **red**—duplicating the colors that appear in the Matched Diagram.

The black bar on the label tells you instantly whether it is the top steel, the middle steel or the bottom steel of the set.

Each label also gives the brand name and the Matched Diagram name of the steel.

You can identify a bar of Matched Tool Steel as far as you can see the label and this will help to avoid any possible errors in misapplying the various grades of steel.

No. 11 SPECIAL

(WATER-HARD)

Type Analysis:	Carbon	1.10%
	Manganese	20%
	Silicon	20%
	Alloys	None

PROPERTIES

DESCRIPTION: *No. 11 Special* is a high carbon, water-hardening tool steel. It is guaranteed to be Tough Timbre, with a medium hardness penetration.

In sections larger than about ½", it hardens with a dense, fine grained case—and a tough, coarser grained core. It owes its hardness and wear resistance to the case, and its toughness to the softer core.

No. 11 Special is 100% acid disc inspected in the billets during manufacture to insure clean sound steel in every bar.

DEFORMATION IN HARDENING: Being a water-hardening steel, *No. 11 Special* will not hold its exact size or shape during hardening. However, if we are to judge from the number of tool makers who have switched from oil-hardening tool steel back to *No. 11 Special,* it must be far above the average in this respect.

DECARBURIZATION: *No. 11 Special* has no unusual tendency to decarburize when heated for hardening. The furnace atmosphere should be neutral or slightly oxidizing.

MACHINABILITY: *No. 11 Special* is the easiest of all tool steels to machine. The absence of special alloys—and good annealing are responsible for this.

USES OF No. 11 SPECIAL: All tools should be made of *No. 11 Special* unless there is some good reason for making them from some special alloy steel. This is the first rule of the Matched Diagram. Typical uses include:

Drills	Threading dies	Cutters
Taps	Blanking dies	Hobs
Reamers	Striking dies	Knurls
Punches	Forming dies	Jig bushings
Arbors	Bending dies	Jigs and fixtures
Stamps	Button dies	Jig feet
Bushings	Coining dies	Dowel pins
Knurls	Ring gauges	Adaptors
Mandrels	Plug gauges	Locating studs

Sizes carried in stock—pages 167-169.

Philadelphi
REGent 74
Park 5351

Baltimore
Vernon 826

No. 11 SPECIAL
(WATER-HARD)

WHEN TO SWITCH FROM No. 11 SPECIAL:

If you want greater wear resistance (at some sacrifice of toughness) use *K-W* (WATER-WEAR).

If you want greater toughness (at some sacrifice of wear resistance) use *Solar* (WATER-TOUGH).

If you want great hardening accuracy or safety, use *Stentor* (OIL-HARD). This steel is used for the same type of work as *No. 11 Special.*

If you want red-hardness for hot forging tools, switch to *D. Y. O.* (RED-HARD). For red-hardness in a metal cutting tool, switch to *Star-Zenith* High Speed Steel (RED-WEAR).

THE HEAT TREATMENT OF No. 11 SPECIAL

To Forge: Heat slowly and uniformly to a maximum temperature of 1950° F., and forge. Cool in air in a dry place.

To Normalize: Forgings are normalized by heating to 1650° F. and cooling in air.

To Anneal: Pack in a suitable container with clean cast iron borings, heat uniformly to 1350°/1375° F., and cool slowly in the furnace. Brinell hardness 160 to 190.

To Harden: Heat slowly and uniformly in a neutral or slightly **oxidizing** atmosphere to 1450° F. and quench in 5% to 10% salt brine. Hardening temperatures under 1440° F. are not recommended for this steel.

Brine is much better than fresh water for quenching **all** of the water-hardening steels of the Matched Set.

Coining dies, striking dies, heading dies, etc., which are under heavy pressure, can be hardened at higher temperatures such as 1500°, 1550° or even 1600° F. to increase the penetration of hardness to prevent sinking.

Hollow impressions on dies should be flushed in quenching. Fresh water is satisfactory as a flush.

In sizes equivalent to about 3/16" round, or smaller, *No. 11 Special* will become file hard when quenched in oil from about 1500° F. This practice is recommended on very small parts to reduce warping, deformation and possible cracking.

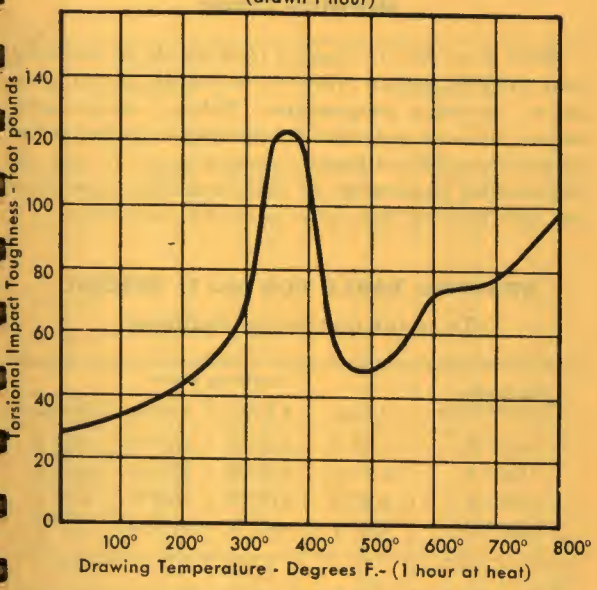
To Draw: The real purpose of drawing is to remove internal strains and increase toughness. A procedure should therefore be adopted which will give the best toughness with the least possible sacrifice of hardness.

The curve given on page 165 shows how various drawing temperatures affect the torsional impact toughness of *No. 11 Special* and the table which follows gives the corresponding Rockwell and Scleroscope hardness values.

Sizes carried in stock—pages 167-169.

No. 11 SPECIAL
(WATER-HARD)

EFFECT OF DRAWING TEMPERATURE ON TOUGHNESS
No. 11 SPECIAL—Brine Quenched from 1450° F.
(drawn 1 hour)



For description of Torsion Impact Testing see page 160.

EFFECT OF DRAWING TEMPERATURE ON HARDNESS

No. 11 SPECIAL—Brine Quenched from 1450° F.—Drawn One Hour

Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope
As hardened	C-66/67	96
200° F.	66/67	96
300° F.	64/65	92
350° F.	**63/64**	**90**
375° F.	62/63	88
400° F.	61/62	86
500° F.	58/59	82
600° F.	54/55	74
700° F.	50/51	68
800° F.	46/47	62

The above data shows that tools made from *No. 11 Special*—when quenched in water or brine from 1450° F.—will have the maximum combination of hardness and toughness when drawn for one hour at 350°/375° F. For other hardening temperatures, or longer drawing times, see the table on page 166.

Sizes carried in stock—pages 167-169.

Philadelphi
REGent 74
Park 5351

Baltimore
Vernon 826

No. 11 SPECIAL

(WATER-HARD)

Effect of Hardening Temperature and Drawing Time:

While most *No. 11 Special* tools should be hardened from 1450° F., certain types of cold forming tools require higher hardening temperatures. Further, exceptionally large or intricate tools should frequently be soaked at the drawing temperature longer than one hour. To find the best drawing temperature for each hardening temperature and each drawing time, refer to the following table.

DRAWING TABLE FOR No. 11 SPECIAL

To secure maximum toughness.

Hardening Temperature	Drawing Time			
	1 hour	4 hours	8 hours	24 hours
1450° F.	350° F.	325° F.	300° F.	275° F.
1500° F.	375° F.	350° F.	325° F.	300° F.
1550° F.	400° F.	375° F.	350° F.	325° F.
1600° F.	425° F.	400° F.	375° F.	350° F.

First, find in the left hand column the hardening temperature used; then decide how **long** the tool should be soaked at the drawing heat and use the drawing temperature given in the table.

For example, if you harden a tool at 1500° F. and decide to draw it four hours, draw it at 350° F. If you quench at 1550° F. and are going to draw 1 hour, use 400° F. If you quench at 1450° F. and want to draw 24 hours, use a temperature of 275° F.

Small tools of very simple shape are sometimes drawn less than one hour. A tool drawn for only 15 minutes should receive 25° more drawing heat than is recommended for a one hour draw.

Small tools hardened in oil should be drawn the same as though they had been quenched from a corresponding temperature into water.

You seldom need to bother trying any other drawing temperature than the one you pick from the above table.

We do not recommend drawing *No. 11 Special* softer than about C-62 Rockwell. If this is not tough enough, you have the wrong steel and should switch to *Solar* (WATER-TOUGH). This, of course, does not apply to shanks and other parts of tools remote from the "business end" which might need to be softened for special reasons.

Sizes carried in stock—pages 167-169.

No. 11 SPECIAL

(WATER-HARD)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Length Feet
⅛x ⅞*	.37	10–12
1*	.43	10–12
2*	.85	10–12
3/16x ¾*	.48	10–12
1*	.64	10–12
1¼*	.80	10–12
2*	1.28	10–12
¼x ½*	.43	10–12
⅝*	.53	10–12
¾*	.64	10–12
1*	.85	10–12
1¼*	1.06	10–12
1½*	1.28	10–12
2*	1.70	10–12
6*	5.10	10–12
⅜x ½*	.64	10–12
⅝*	.80	10–12
¾*	.96	10–12
⅞*	1.12	10–12
1*	1.28	10–12
1¼*	1.59	10–12
1½*	1.91	10–12
1¾*	2.23	10–12
2*	2.55	10–12
2½*	3.19	10–12
3*	3.83	10–12
3½*	4.46	10–12
4*	5.10	10–12
½x ⅝*	1.06	10–12
¾*	1.28	10–12
⅞*	1.49	10–12
1*	1.70	10–12
1¼*	2.13	10–12
1½*	2.55	10–12
1¾*	2.98	10–12
2*	3.40	10–12
2½*	4.25	10–12
3*	5.10	10–12
3½*	5.95	10–12
4*	6.80	10–12
4½*	7.65	10–12
5*	8.50	10–12
6*	10.20	10–12

FLATS

Size Inches	Estimated Weight Per Foot	Stock Length Feet
⅝x ¾*	1.59	10–12
⅞*	1.86	10–12
1*	2.13	10–12
1⅛*	2.39	10–12
1¼*	2.66	10–12
1½*	3.19	10–12
1¾*	3.72	10–12
2*	4.25	10–12
2¼*	4.78	10–12
2½*	5.31	10–12
2¾*	5.84	10–12
3*	6.38	10–12
3½*	7.44	10–12
4*	8.50	10–12
5*	10.63	10–12
¾x1*	2.55	10–12
1¼*	3.19	10–12
1½*	3.83	10–12
1¾*	4.46	10–12
2*	5.10	10–12
2¼*	5.74	10–12
2½*	6.38	10–12
2¾*	7.01	10–12
3*	7.65	10–12
3½*	8.93	10–12
4*	10.20	10–12
4½*	11.48	10–12
5*	12.75	10–12
6*	15.30	10–12
⅞x1*	2.98	10–12
1¼*	3.72	10–12
1⅜*	4.09	10–12
1½*	4.46	10–12
2*	5.95	10–12
2½*	7.44	10–12
3*	8.93	10–12
3½*	10.41	10–12
3¾*	11.16	10–12
4½*	13.39	10–12
5*	14.88	10–12
1 x1¼*	4.25	10–12
1½*	5.10	10–12
1¾*	5.95	10–12
2*	6.80	10–12
2¼*	7.65	10–12
2½*	8.50	10–12

FLATS—Continued on Next Page

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

iladelphia
Gent 7450
ark 5351
altimore
rnon 8260
SOLAR
K-W
STENTOR
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

No. 11 SPECIAL

(WATER-HARD)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Length Feet
1 x3*	10.20	10–12
3½*	11.90	10–12
3¾*	12.75	10–12
4*	13.60	10–12
5*	17.00	10–12
6*	20.40	10–12
7*	23.80	10–12
8*	27.20	10–12
1¼x1½*	6.38	10–12
1¾*	7.44	10–12
2*	8.50	10–12
2¼*	9.56	10–12
2½*	10.63	10–12
3*	12.75	10–12
3¼*	13.81	10–12
3½*	14.88	10–12
4*	17.00	10–12
4½*	19.13	10–12
5*	21.25	10–12
6*	25.50	10–12
7*	29.75	10–12
8*	34.00	10–12
1½x2*	10.20	10–12
2¼*	11.48	10–12
2½*	12.75	10–12
3*	15.30	10–12
3½*	17.85	10–12
4*	20.40	10–12
4½*	22.95	10–12
5*	25.50	10–12
6*	30.60	10–12
7*	35.70	10–12
8*	40.80	10–12
1¾x2*	11.90	10–12
2¼*	13.39	10–12
2½*	14.88	10–12
2¾*	16.36	10–12

FLATS

Size Inches	Estimated Weight Per Foot	Stock Length Feet
1¾x3*	17.85	10–12
3½*	20.83	10–12
4*	23.80	10–12
4½*	26.78	10–12
6*	35.70	10–12
2 x2¼*	15.30	10–12
2½*	17.00	10–12
2¾*	18.70	10–12
3*	20.40	10–12
3½*	23.80	10–12
4*	27.20	10–12
5*	34.00	10–12
6*	40.80	10–12
7*	47.60	10–12
8*	54.40	10–12
2¼x2¾*	21.04	10–12
3½*	26.78	10–12
4*	30.60	10–12
2½x3*	25.50	10–12
4*	34.00	10–12
4½*	38.25	10–12
5*	42.50	10–12
6*	51.00	10–12
7*	59.50	10–12
2¾x3½*	32.73	10–12
3 x3½*	35.70	10–12
4*	40.80	10–12
4½*	45.90	10–12
5*	51.00	10–12
6*	61.20	10–12
3½x5*	59.50	10–12
6*	71.40	10–12
4 x5*	68.00	10–12

SQUARES

¼*	.21	10–12
5/16*	.33	10–12
⅜*	.48	10–12
7/16*	.65	10–12
½*	.85	10–12
⅝*	1.33	10–12
¾*	1.91	10–12
⅞*	2.60	10–12
1*	3.40	10–12
1⅛*	4.30	10–12
1¼*	5.31	10–12
1⅜*	6.43	10–12
1½*	7.65	10–12

SQUARES

1⅝*	8.98	10–12
1¾*	10.41	10–12
2*	13.60	10–12
2¼*	17.21	10–12
2½*	21.25	10–12
2¾*	25.71	10–12
3*	30.60	10–12
3¼*	35.91	10–12
3½*	41.65	10–12
4*	54.40	10–12

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

No. 11 SPECIAL

(WATER-HARD)

TOOL STEEL—ANNEALED

ROUNDS			ROUNDS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
1/4*	.17	10–12	2 1/2	16.69	10–12
5/16*	.26	10–12	2 5/8*	18.40	10–12
3/8	.38	10–12	2 3/4	20.20	10–12
13/32*	.44	10–12	2 7/8*	22.07	10–12
7/16*	.51	10–12			
1/2	.67	10–12			
9/16*	.85	10–12	3	24.03	10–12
5/8	1.04	10–12	3 1/8*	26.08	10–12
11/16*	1.26	10–12	3 1/4*	28.21	10–12
23/32*	1.38	10–12	3 3/8*	30.42	10–12
3/4	1.50	10–12	3 1/2*	32.71	10–12
13/16*	1.76	10–12	3 5/8*	35.09	10–12
7/8	2.04	10–12	3 3/4*	37.55	10–12
15/16*	2.35	10–12			
			4*	42.73	10–12
1	2.67	10–12	4 1/8*	45.44	10–12
1 1/16*	3.01	10–12	4 1/4*	48.23	10–12
1 1/8	3.38	10–12	4 3/8*	51.11	10–12
1 3/16*	3.77	10–12	4 1/2*	54.08	10–12
1 1/4	4.17	10–12	4 3/4*	60.25	10–12
1 5/16*	4.60	10–12			
1 3/8	5.05	10–12			
1 7/16*	5.52	10–12	5*	66.76	10–12
1 1/2	6.01	10–12	5 1/4*	73.60	10–12
1 5/8*	7.05	10–12	5 1/2*	80.78	10–12
1 3/4	8.18	10–12			
1 7/8*	9.39	10–12			
			6*	96.13	10–12
2	10.68	10–12	6 1/4*	104.31	10–12
2 1/8*	12.06	10–12	6 1/2*	112.82	10–12
2 1/4	13.52	10–12			
2 3/8*	15.06	10–12			
			7*	130.85	10–12
			7 3/4*	160.39	10–12
			8*	170.90	10–12

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

iladelphia
Gent 7450
ark 5351
altimore
rnon 8260
SOLAR
K-W
STENTOR
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

SOLAR

(WATER-TOUGH)

Type Analysis:	Carbon	.50%
	Manganese	.40%
	Silicon	1.00%
	Molybdenum	.50%

PROPERTIES

DESCRIPTION: *Solar* is a water-hardening alloy tool steel of extreme toughness. It hardens to about C-62 Rockwell, and when drawn back to about C-59 Rockwell, it is the strongest and toughest tool steel known.

A tensile test on *Solar*, properly treated, will show:

Breaking strength.....323,000 pounds per sq. in.
Elongation in 2″.....4.5%

Even with this great hardness and strength, *Solar* is ductile enough to **stretch** more than 4% before breaking. At C-59 Rockwell, *Solar* will bend before it will break.

When hardened in medium and large sized pieces, *Solar* acquires a hard case and a tough core. For example, in the 1½″ round piece shown, there is a fine grained case about 3/16″ to ¼″ deep showing C-61/63 Rockwell hardness; and a tough, coarser grained core showing about C-40/45 Rockwell. Sizes under ¾″ round will harden clear through.

DEFORMATION IN HARDENING: Since *Solar* hardens deeper than *No. 11 Special* (WATER-HARD), it tends to expand more in hardening. *Solar* will expand in larger sizes where the straight carbon steel would shrink. Also, rectangular blocks of *Solar* will tend to harden with **concave** faces. That is, the flat surfaces will become slightly hollow, whereas *No. 11 Special* would bulge under similar conditions. *Solar* is not recommended for tools that must hold size and shape accurately in hardening. This is the field for *R. D. S.* (OIL-TOUGH).

Sizes carried in stock—page 174.

SOLAR

(WATER-TOUGH)

DECARBURIZATION: Because of its high content of silicon and molybdenum, *Solar* is more likely to decarburize when heated than any other steel in the Matched Set.

This is virtually the **only** bad habit *Solar* has—and even it can be avoided by proper heating and furnace control (see hardening instructions). If *Solar* tools are generously ground after hardening, decarburization does not matter.

MACHINABILITY: Being an alloy steel, *Solar* does not machine as readily as *No. 11 Special*. It is not as difficult to machine as High Speed Steel, but might be classed as intermediate between these two.

USES OF SOLAR: The rule of the Matched Diagram is:—When *No. 11 Special* (WATER-HARD) is not **tough** enough for a job, travel south and use *Solar* (WATER-TOUGH). As a general rule, you do not draw *No. 11 Special* below C-62 Rockwell—if this is not tough enough, use *Solar*.

Solar hardens to about C-61 to C-63 Rockwell and after drawing to C-60, it is very much tougher than *No. 11 Special* (WATER-HARD) would be at this same hardness.

In almost every tool room and shop, there are a vast number of tools or parts that must, above all else, be tough. Along with this toughness we want all the hardness and wear resistance we can get, but they must not break. Here are just a few, as reminders—you can fill in the list almost without limit.

Long slender punches	Heavy duty forming tools
Punches with fragile projections	Heavy duty bending tools
Heavy duty perforating punches	Heavy duty coining dies
Knock-out pins	Shear blades
Fingers	Spring collets
Clutch pins	Feed fingers
Stops	Special knurls
Indexing pins	Stamps
Screw extractors	Circular shear blades

If these tools were made of straight carbon tool steel, you would draw them back to a "blue"—and often "blue" isn't half far enough. *Solar* fits into this field like a key into its lock.

Here is another group frequently referred to as "battering tools":

Pneumatic chisels	Spike mauls	Screw drivers
Hand chisels	Nail sets	Rivet sets
Rivet busters	Flaring tools	Sledges
Beading tools	Track chisels	Boiler punches
Flue expanders	Pipe cutter wheels	Drift pins

Sizes carried in stock—page 174.

iladelphia
Gent 7450
ark 5351
altimore
rnon 8260
SOLAR
K-W
STENTOR
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelph
REGent 74
Park 535

Baltimore
Vernon 82

SOLAR

(WATER-TOUGH)

All of these tools demand a combination of hardness and toughness that can be squeezed out of carbon tool steel only by lowering the percentage of carbon and drawing back entirely too far. There is not a job in this list that *Solar* has not done—and done well. For most of them it is by far the best steel we know of—regardless of price.

WHEN TO SWITCH FROM SOLAR:

1. If you want greater hardness and wear resistance than *Solar* can deliver, use *No. 11 Special* (WATER-HARD).

   NOTE: Do not make this shift until you are **sure** your trouble is not due to surface decarburization. Grind or file below the surface and see whether the hardness increases. If it does—try to do a better job of hardening before trying *No. 11 Special.*
2. If *Solar* changes size or warps too much in hardening—or if the shape is so intricate that you do not dare to quench it in water—use *R. D. S.* (OIL-TOUGH). This steel is used for the same general purpose as *Solar* but it is oil-hardening and non-deforming.
3. If the tools get hotter than 300° F., in service, go **east** and select *Excelo* (RED-TOUGH).

THE HEAT TREATMENT OF SOLAR

To Forge: Forge from a temperature not over 2100° F. Heat rapidly and avoid unnecessary soaking in order to minimize surface decarburization. Cool the forgings in air in a dry place.

To Normalize: Forgings are normalized by heating to 1650° F. and cooling in air.

To Anneal: Pack in a suitable container with clean cast iron borings. Heat uniformly to 1350° to 1400° F., and cool slowly in the furnace. Brinell hardness will average 190 to 220.

To Harden: Heat uniformly to 1550° F. and quench in 5% to 10% salt brine. Leave the tools in the brine until cold enough to handle.

Small parts may be heated to 1600° F. and quenched in oil.

To prevent surface decarburization (or bark), heat in a lead pot when practicable—or if a furnace is used—adjust the valves so there is a flame floating in the furnace, then add a shade of **air** so the flame just disappears. This gives you a slightly **oxidizing** atmosphere which will produce the greatest skin hardness. Heat the steel quickly and soak it only long enough to heat the piece clear through. A smoky furnace atmosphere will decarburize *Solar.*

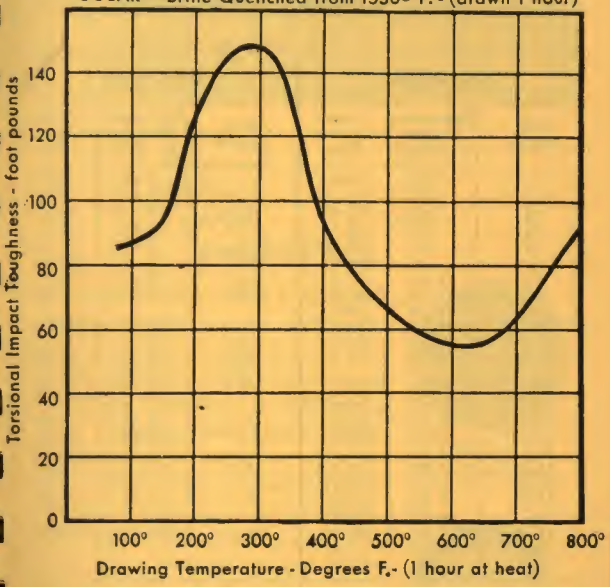
To Draw: The effect of drawing upon the torsional impact toughness and hardness of *Solar* is as follows:

Sizes carried in stock—page 174.

SOLAR

(WATER-TOUGH)

EFFECT OF DRAWING TEMPERATURE ON TOUGHNESS
SOLAR—Brine Quenched from 1550° F. - (drawn 1 hour)



For description of Torsion Impact Testing, see page 160.

EFFECT OF DRAWING TEMPERATURE ON HARDNESS

SOLAR—Brine Quenched from 1550° F.—Drawn One Hour

Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope
As hardened	C-61/63	87
200° F.	61/62	86
250° F.	60/61	85
300° F.	59/60	83
350° F.	58/59	82
400° F.	57/58	79
500° F.	55/56	76
600° F.	54/55	74
700° F.	52/53	71

For practically **all** water (or brine) quenched tools, we recommend a drawing temperature of 275° to 300° F. for one hour—or longer, according to size. Shanks of pneumatic chisels are drawn at 900° F.

When *Solar* tools are **oil quenched** from 1600° F., they frequently need not be drawn at all and will then show C-59/61 Rockwell. If the shape is intricate, draw at 200° to 250° F., to relieve the hardening strains.

Do not draw *Solar* to **color,** because a straw color begins to appear above 400° F.—which is too hot for most tools.

Sizes carried in stock—page 174.

iladelphia
Gent 7450
ark 5351
altimore
rnon 8260
K-W
STENTOR
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelph
REGent 74
Park 535
Baltimore
Vernon 82

SOLAR

(WATER-TOUGH)

TOOL STEEL—ANNEALED

ROUNDS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
¼	.17	10–12
5/16	.26	10–12
⅜	.38	10–12
7/16	.51	10–12
½	.67	10–12
9/16	.85	10–12
⅝	1.04	10–12
11/16	1.26	10–12
¾	1.50	10–12
13/16	1.76	10–12
⅞	2.04	10–12
15/16*	2.35	10–12
1	2.67	10–12
1 1/16*	3.01	10–12
1⅛	3.38	10–12
1 3/16*	3.77	10–12
1¼	4.17	10–12
1 5/16*	4.60	10–12
1⅜*	5.05	10–12
1 7/16*	5.52	10–12
1½	6.01	10–12
1⅝*	7.05	10–12
1¾	8.18	10–12
1⅞*	9.39	10–12

ROUNDS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
2	10.68	10–12
2⅛*	12.06	10–12
2¼*	13.52	10–12
2⅜*	15.06	10–12
2½	16.69	10–12
2⅝*	18.40	10–12
2¾*	20.20	10–12
2⅞*	22.07	10–12
3	24.03	10–12
3¼*	28.21	10–12
3½*	32.71	10–12
3⅝*	35.09	10–12
3¾*	37.55	10–12
4*	42.73	10–12
4¼*	48.23	10–12
4½*	54.08	10–12
4¾*	60.25	10–12
5*	66.76	10–12
6*	96.13	10–12

FLATS

¼x⅝*	.53	10–12
½x1½*	2.55	10–12
2*	3.40	10–12
3*	5.10	10–12
⅝x2*	4.25	10–12
¾x1*	2.55	10–12
2*	5.10	10–12
3*	7.65	10–12
1x1½*	5.10	10–12
2*	6.80	10–12
3*	10.20	10–12

SQUARES

¼*	.21	10–12
5/16*	.33	10–12
⅜*	.48	10–12
½*	.85	10–12
9/16*	1.08	10–12
⅝*	1.33	10–12
¾*	1.91	10–12
⅞*	2.60	10–12
1*	3.40	10–12
1¼*	5.31	10–12
1½	7.65	12–14
1¾*	10.41	10–12
2*	13.60	10–12

OCTAGONS

¼	.18	10–12
5/16	.28	10–12
⅜	.40	12–14
7/16*	.54	10–12
½	.70	12–14
⅝	1.10	12–14
¾	1.58	12–14
13/16	1.86	10–12
⅞	2.16	12–14
1	2.82	12–14
1⅛*	3.56	10–12
1¼	4.40	12–14
1½	6.34	12–14

HEXAGONS

½*	.74	10–12
⅝*	1.15	10–12
¾*	1.66	10–12
⅞*	2.25	10–12
1*	2.94	10–12

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

K-W
(WATER-WEAR)

Type Analysis:	Carbon	1.30%
	Manganese	.30%
	Silicon	.45%
	Tungsten	3.50%

PROPERTIES

1550° F.
K-W Fracture

1550° F.
K-W Etched Disc

DESCRIPTION: *K-W* is a water-hardening tool steel that will resist wear and abrasion from four to ten times longer than plain carbon tool steel. When hardened, it acquires a peculiar slippery-hard surface which is so difficult to scratch that even an ordinary emery wheel can scarcely cut it. Special wheels are used for grinding *K-W* tools as described on page 179. Because of the "soapy" nature of the hardened surface, *K-W* tools do not gall or pick up as quickly as other tools.

K-W is a surface hardening steel and hardens with a somewhat thinner case than *No. 11 Special*. The hard case is backed up with a coarser grained, tougher core having a Rockwell hardness of about C-45/50. *K-W* billets are 100% acid disc inspected to insure clean sound metal in the finished bars.

DEFORMATION IN HARDENING: Being a shallow hardening, water quenched steel, *K-W* tends to shrink in hardening. This is a useful property in draw dies which can frequently be shrunk enough in rehardening to take up the wear, thus allowing them to be re-used for the same size.

K-W is not recommended for tools that must hold size and shape accurately in hardening. For such tools, use *Hampden* (OIL-WEAR).

DECARBURIZATION: Tungsten increases the tendency toward surface decarburization in hardening. Also, the higher hardening temperature of *K-W* (1525° to 1600° F.) helps this tendency along. Generous grinding allowances should be made where possible, and if not—pay particular attention to the hardening instructions so that decarburization may be avoided.

Sizes carried in stock—pages 180-181.

Philadelph
REGent 74
Park 535
Baltimore
Vernon 826

K-W
(WATER-WEAR)

MACHINABILITY: *K-W* machines almost as well as *No. 11 Special.* It averages to be a little bit harder.

USES OF K-W: The rule of the Matched Diagram is—use *K-W* for all water-hardening tool steel jobs where you want more wear resistance and greater production than *No. 11 Special* (WATER-HARD) will deliver. Therefore, *K-W* has been successfully used for a wide variety of tools. The following is a typical list selected from letters that our customers have written us about the uses of this steel:

Plug gauges	Guide strips	Notching punches
Push broaches	Forming dies	Stone planer tools
Burnishing plugs	Forming rolls	Reamers
Sizing plugs	Cam rollers	Turning tools (cast iron)
Burnishing tools	Arbors	Combination dies
Tube drawing dies	Forming punches	Sectional blanking dies
Wire drawing dies	Die collars	Piercing punches
Draw dies for stainless steel	Nibbling punches	Ball header dies
Extruding dies (cold)	Brass cutting tools	
	Special stamps	

WHEN TO SWITCH FROM K-W:

If you want greater toughness, use *No. 11 Special* (WATER-HARD).

If you want greater hardening accuracy or safety, use *Hampden* (OIL-WEAR). This steel is used for the same wear resisting jobs as *K-W*.

If service temperature gets above 300° F. and softens the *K-W* tools, use *Star-Zenith* High Speed Steel (RED-WEAR). This steel likewise possesses great wear resistance and will function at temperatures up to 1100° F.

If the shallow hardened case of *K-W* limits its use on heavy coining and compression tools, use *Hampden* (OIL-WEAR) which hardens very deep.

If hardness or wear resistance seem lacking, the trouble is probably surface decarburization or some other hardening difficulty. There is no more wear resisting steel than *K-W*.

THE HEAT TREATMENT OF K-W

To Forge: Forge from a temperature not over 1900° F. and allow the forgings to cool in air in a dry place.

To Normalize: Forgings are normalized by heating to 1675° F. and cooling in air.

To Anneal: Pack in a suitable container with clean cast iron borings, heat uniformly to 1440° to 1460° F. and cool slowly in the furnace. Average Brinell 200 to 230.

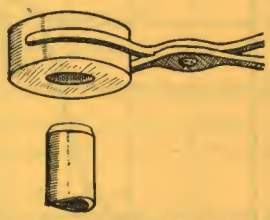
To Harden: Heat uniformly to 1525° to 1600° F. (according to size and hardness penetration desired) and quench in 5% to 10% salt brine.

Sizes carried in stock—pages 180-181.

K-W

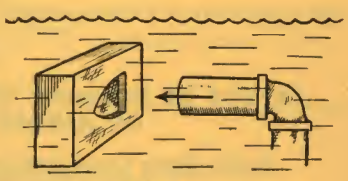
(WATER-WEAR)

To avoid surface decarburization, adjust the burners so that there is a flame floating in the furnace, then add a shade of **air** so that the flame just disappears. This will produce a slightly **oxidizing** atmosphere which will produce maximum surface hardness. If a *K-W* tool appears to have failed to harden properly, explore it for decarburized skin before attempting to reharden it. Rehardening will only serve to make a decarburized surface worse.

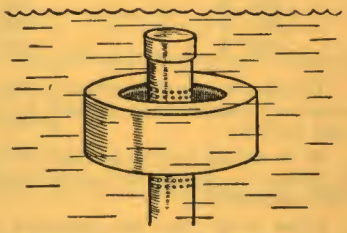


Water nozzle machined to seat tightly against throat of draw die. Outside of die is kept dry.

To avoid soft spots (due to the shallow hardening nature of this steel) never use fresh water for quenching excepting in a flush. Always use 5% to 10% salt brine in a still quenching tank. Use flushing fixtures for quenching *K-W* tools that have hollow impressions—as suggested by the sketches.



Submerged flush for quenching die with cavity.



Submerged spray for flushing large draw rings.

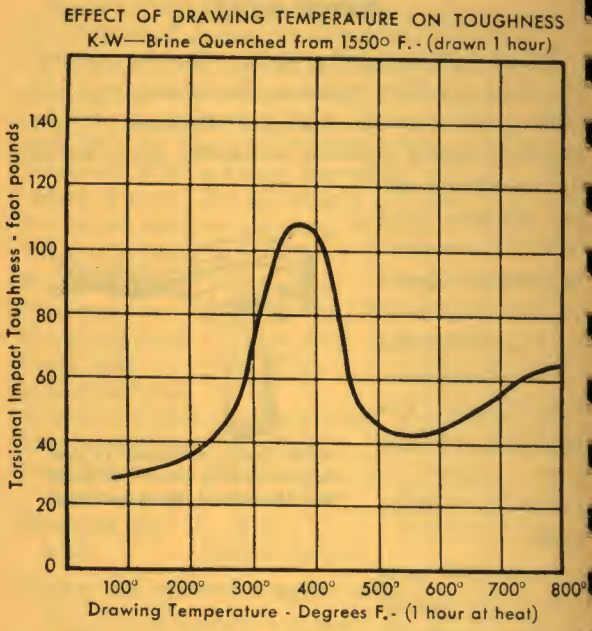
To Draw: The effect of different drawing temperatures on the torsional impact toughness and hardness of *K-W* is shown on page 178.

Sizes carried in stock—pages 180-181.

iladelphia
Gent 7450
ark 5351
altimore
rnon 8260
STENTOR
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
FENCES
INDEX
hnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

K-W

(WATER-WEAR)



For description of Torsion Impact Testing, see page 159.

EFFECT OF DRAWING TEMPERATURES ON HARDNESS

K-W—Brine Quenched from 1550° F.—Drawn One Hour

Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope
As hardened	C-67/68	98
200° F.	66/67	96
300° F.	66/67	96
350° F.	**65/66**	**94**
400° F.	64/65	92
500° F.	62/63	88
600° F.	60/61	85
700° F.	54/55	74

The above data shows that the best combination of hardness and toughness is secured by drawing between 350° and 375° F.

K-W should seldom be drawn hotter than 400°/425° F. If greater toughness is needed, switch to *No. 11 Special* (WATER-HARD).

Draw rings that are hardened in the hole **only** are frequently used without drawing at all.

To Grind: Because of its extreme wear resistance, *K-W* is difficult to grind with the usual grinding wheels. The Norton Company and The Carborundum Company have

Sizes carried in stock—pages 180-181.

K-W
(WATER-WEAR)

cooperated to develop special wheels which they recommend for grinding *K-W* Steel. Their recommendations are necessarily of a general nature, and specific problems should be taken up with the Service Departments of the abrasive manufacturers.

NORTON COMPANY
WORCESTER, MASS.

SURFACE GRINDING: Fast table traverse (about 240″ per minute) is recommended for better finish, cooler grinding and better wheel economy.

Fast traverse (240″ per min.)—wet or dry
Roughing—use wheel 3846-H8BE
Finishing—use wheel 3880-H8BE

Slow traverse (130″ per min.)—wet or dry
Roughing—use wheel 3846-G8BE
Finishing—use wheel 3880-G8BE

CYLINDRICAL GRINDING: Roughing and finishing—use wheel 3860-J5BE.

INTERNAL GRINDING: Roughing and finishing—use wheel 3860-I8BE.

LAPPING: Refer to Norton Engineering Department.

THE CARBORUNDUM COMPANY
NIAGARA FALLS, N. Y.

SURFACE GRINDING: Fast traverse, approximately 50 to 100 feet per min. Wet or dry.

Roughing and finishing—80AF2-P-175.

Slow Traverse, approximately 20 ft. per min. Wet or dry.

Roughing and finishing—80AF2-S-173.

CYLINDRICAL GRINDING: Use Aloxite Brand Vitrified Wheels.

Roughing—60A-M-178.

Finishing—80A-N-177.

INTERNAL GRINDING: Use Aloxite Brand Vitrified Wheels.

Sizes up to 1½″ dia.—80A-R-174S.
Larger than 1½″ dia.—60A-R-174S.

LAPPING: Consult Carborundum Service Department.

Sizes carried in stock—pages 180-181.

Philadelph
REGent 74
Park 535
Baltimore
Vernon 82

K-W

(WATER-WEAR)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
¼x ½*	.43	10–12
¾*	.65	10–12
1*	.86	10–12
1¼*	1.08	10–12
1½*	1.29	10–12
2*	1.73	10–12
⅜x ¾*	.97	10–12
1*	1.29	10–12
1½*	1.94	10–12
2*	2.59	10–12
3*	3.88	10–12
4*	5.18	10–12
½x ¾*	1.29	10–12
1*	1.73	10–12
1½*	2.59	10–12
2*	3.45	10–12
2½*	4.31	10–12
3*	5.18	10–12
4*	6.90	10–12
5*	8.63	10–12
⅝x2*	4.31	10–12
¾x1¼*	3.24	10–12
1½*	3.88	10–12
1¾*	4.53	10–12
2*	5.18	10–12
2½*	6.47	10–12
3*	7.76	10–12
3½*	9.06	10–12
4*	10.35	10–12
6*	15.53	10–12

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
1 x1½*	5.18	10–12
2*	6.90	10–12
2½*	8.63	10–12
3*	10.35	10–12
3½*	12.08	10–12
4*	13.80	10–12
5*	17.26	10–12
6*	20.71	10–12
1¼x2*	8.63	10–12
2½*	10.78	10–12
3*	12.94	10–12
3½*	15.10	10–12
4*	17.26	10–12
5*	21.57	10–12
6*	25.88	10–12
1½x2*	10.35	10–12
3*	15.53	10–12
4*	20.71	10–12
5*	25.88	10–12
6*	31.06	10–12
2 x3*	20.71	10–12
4*	27.61	10–12
5*	34.51	10–12
6*	41.41	10–12
2½x6*	51.77	10–12

*Sizes thus marked Reading, Pa., stock.

See High Speed Steel Extras for { Annealing, page 294. Size, page 293. Quantity, page 294. Cutting, page 297.

K-W

(WATER-WEAR)

TOOL STEEL—ANNEALED

ROUNDS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
1/4*	.17	10–12
5/16*	.26	10–12
3/8*	.38	10–12
7/16*	.52	10–12
1/2*	.68	10–12
9/16*	.86	10–12
5/8*	1.06	10–12
11/16*	1.28	10–12
3/4*	1.52	10–12
13/16*	1.79	10–12
7/8*	2.07	10–12
15/16*	2.38	10–12
1*	2.71	10–12
1 1/16*	3.06	10–12
1 1/8*	3.43	10–12
1 1/4*	4.24	10–12
1 5/16*	4.67	10–12
1 3/8*	5.12	10–12
1 1/2*	6.10	10–12
1 5/8*	7.16	10–12
1 3/4*	8.30	10–12
1 7/8*	9.53	10–12
2*	10.84	10–12
2 1/8*	12.24	10–12
2 1/4*	13.72	10–12
2 3/8*	15.29	10–12
2 1/2*	16.94	10–12
2 5/8*	18.68	10–12
2 3/4*	20.50	10–12
2 7/8*	22.40	10–12
3*	24.39	10–12
3 1/8*	26.47	10–12
3 1/4*	28.63	10–12
3 3/8*	30.87	10–12

ROUNDS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
3 1/2*	33.20	10–12
3 5/8*	35.62	10–12
3 3/4*	38.12	10–12
3 7/8*	40.70	10–12
4*	43.37	10–12
4 1/8*	46.12	10–12
4 1/4*	48.96	10–12
4 1/2*	54.89	10–12
4 3/4*	61.15	10–12
5*	67.76	10–12
5 1/4*	74.71	10–12
5 1/2*	81.99	10–12
5 3/4*	89.61	10–12
6*	97.57	10–12
6 1/4*	105.87	10–12
6 1/2*	114.51	10–12
7*	132.81	10–12

SQUARES

3/8*	.49	10–12
1/2*	.86	10–12
5/8*	1.35	10–12
3/4*	1.94	10–12
1*	3.45	10–12
1 1/4*	5.39	10–12
1 1/2*	7.76	10–12
1 3/4*	10.57	10–12
2*	13.80	10–12
3*	31.06	10–12
4*	55.22	10–12

*Sizes thus marked Reading, Pa., stock.

See High Speed Steel Extras for
Annealing, page 294.
Size, page 293.
Quantity, page 294.
Cutting, page 297.

STENTOR
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

STENTOR
(OIL-HARD)

Type Analysis: Carbon..... .90%
Manganese..... 1.60%
Silicon..... .25%

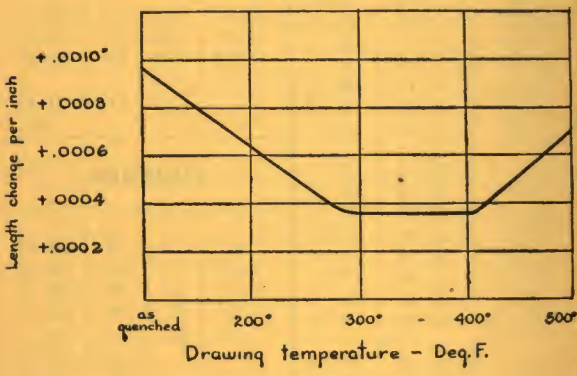
PROPERTIES

DESCRIPTION: *Stentor* is an oil-hardening, non-deforming tool steel. It possesses maximum safety from hardening cracks when quenched in intricate sections and will harden with a minimum of size change and warpage.

Stentor is made from billets that are 100% acid disc inspected which insures clean sound metal in the finished bars.

DEFORMATION IN HARDENING: Oil-hardening steels hold size best only when quenched from the proper hardening temperature. If overheated they tend to expand; and if underheated they tend to shrink.

SIZE CHANGE OF STENTOR



When properly hardened, *Stentor* will expand slightly—but upon being drawn, it returns very closely to its original size. The chart shows the average size change in *Stentor* per inch of length. That is, a piece 1" long will expand approximately .001" when hardened, but upon being drawn between 300° and 400° F., it will return within about .0004" of its original size.

Because *Stentor* is free from alloys like tungsten, chromium, etc., it hardens at a very low temperature (1400° to 1440° F.), which holds warping down to an absolute minimum.

Sizes carried in stock—pages 186-187.

STENTOR

(OIL-HARD)

DECARBURIZATION: *Stentor* is no more subject to surface decarburization than *No. 11 Special* (WATER-HARD). This is very important because *Stentor* holds size so accurately that many people do not grind their tools after hardening. The freedom of *Stentor* from soft skin is so unusual in an oil-hardening tool steel that some tool makers do not even know that such a thing is possible. They should try *Stentor*.

MACHINABILITY: Again, because of the absence of complicated, hard-machining alloys, *Stentor* is the easiest of all oil-hardening tool steels to machine. It cuts just about the same as water-hardening tool steel.

USES OF STENTOR: The rule of the Matched Diagram is—use *Stentor* in place of *No. 11 Special* (WATER-HARD) whenever you want greater **accuracy** or **safety** in hardening.

Since *Stentor* is the oil-hardening running mate of *No. 11 Special,* it is likely to be used for the same type of tools. *Stentor* is most commonly used for:

Blanking dies	Broaches
Forming dies	Cutter plates
Lamination dies	Gauges
Molding dies	Master tools
Sub-press dies	Spindles
Thread roller dies	Master taps
Trimming dies	Thread gauges
Precision tools	Push broaches

WHEN TO SWITCH FROM STENTOR:

If the tool does **not** require accurate hardening—if it is **not** likely to crack when hardened in water—use *No. 11 Special* (WATER-HARD).

If you want greater wear resistance—or for working abrasive materials, and if you have some toughness to spare, use *Hampden* (OIL-WEAR).

If *Stentor* is not tough enough to resist chipping or cracking, do not draw higher than 400° F., change to *R. D. S.* (OIL-TOUGH).

THE HEAT TREATMENT OF STENTOR

To Forge: Forge from a temperature not over 1950° F. and allow the forgings to cool in air in a dry place.

To Normalize: Forgings are normalized by heating to 1500° F. and cooling in air.

Sizes carried in stock—pages 186-187.

STENTOR

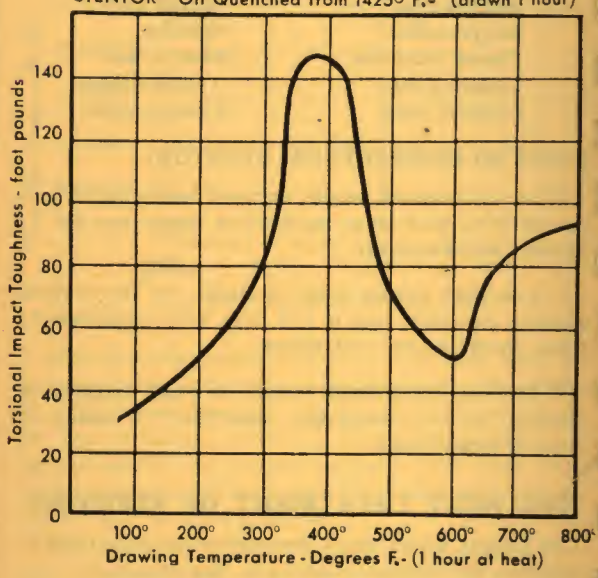
(OIL-HARD)

To Anneal: Pack in a suitable container with clean cast iron borings, heat uniformly to 1375°/1400° F., and cool slowly in the furnace. Average Brinell hardness 170 to 200.

NOTE: If a large amount of metal is removed in machining, the resulting machining strains may cause warping in hardening. To avoid this, first rough machine—then anneal **below the critical** or about 1250° to 1300° F., and cool slowly. Then finish machine. Annealing is much cheaper than stoning.

To Harden: Heat slowly and uniformly in a **slightly oxidizing** furnace atmosphere to 1400° to 1440° F., soak until uniformly heated throughout, then quench in oil. Very small pieces are hardened at 1400° F., pieces about 1" round at 1420° F., and large pieces at 1440° F. The more accurately you observe these temperatures, the more accurately your tools will hold size.

To Draw: The effect of different drawing temperatures upon the torsional impact toughness and hardness of *Stentor* is shown below.



For description of Torsion Impact Testing, see page 159.

Sizes carried in stock—pages 186-187.

STENTOR

(OIL-HARD)

EFFECT OF DRAWING TEMPERATURES ON HARDNESS

STENTOR—Oil Quenched from 1425° F.—
Drawn One Hour

Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope
As hardened	C-64/65	92
200° F.	64/65	92
300° F.	63/64	90
350° F.	62/63	88
375° F.	61/62	86
400° F.	60/61	85
500° F.	58/59	82
600° F.	54/55	74
700° F.	50/51	68

The best combination of hardness and toughness in *Stentor* tools is secured by drawing at 375° to 400° F. It is seldom advisable to draw *Stentor* higher than this. If this is not tough enough, switch to *R. D. S.* (OIL-TOUGH).

Large sized tools should be drawn longer than one hour. Every time you double the drawing time, cut 25° off the temperature—for example:

Drawing time	Drawing temperature
1 hour	375° F.
2 hours	350° F.
4 hours	325° F.
8 hours	300° F.

Sizes carried in stock—pages 186-187.

Philadelph
REGent 74
Park 535
Baltimore
Vernon 82

STENTOR

(OIL-HARD)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
¼x ½*	.43	10–12
⅝*	.53	10–12
¾*	.64	10–12
1 *	.85	10–12
1¾*	1.49	10–12
6*	5.10	10–12
⅜x ¾*	.96	10–12
1	1.28	10–12
1¼*	1.59	10–12
1½*	1.91	10–12
1¾*	2.23	10–12
2	2.55	10–12
3	3.83	10–12
4	5.10	10–12
6*	7.65	10–12
½x ⅝*	1.06	10–12
¾*	1.28	10–12
1	1.70	10–12
1¼	2.13	10–12
1½	2.55	10–12
1¾*	2.98	10–12
2	3.40	10–12
2¼*	3.83	10–12
2½	4.25	10–12
3	5.10	10–12
4	6.80	10–12
5	8.50	10–12
6	10.20	10–12
⅝x1	2.13	10–12
1¼	2.66	10–12
1½	3.19	10–12
1¾*	3.72	10–12
2	4.25	10–12
2¼*	4.78	10–12
2½*	5.31	10–12
3	6.38	10–12
4	8.50	10–12
5*	10.63	10–12
6	12.75	10–12
¾x1	2.55	10–12
1¼*	3.19	10–12
1½	3.83	10–12
1¾*	4.46	10–12
2	5.10	10–12
2¼*	5.74	10–12
2½	6.38	10–12
3	7.65	10–12
3½	8.93	10–12
4	10.20	10–12
5	12.75	10–12
6	15.30	10–12

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
1 x1¼	4.25	10–12
1½	5.10	10–12
1¾*	5.95	10–12
2	6.80	10–12
2¼*	7.65	10–12
2½	8.50	10–12
2¾*	9.35	10–12
3	10.20	10–12
3½	11.90	10–12
4	13.60	10–12
4½	15.30	10–12
5	17.00	10–12
6	20.40	10–12
7	23.80	10–12
8	27.20	10–12
1¼x1½	6.38	10–12
1¾*	7.44	10–12
2	8.50	10–12
2½	10.63	10–12
3	12.75	10–12
3½	14.88	10–12
4	17.00	10–12
4½*	19.13	10–12
5	21.25	10–12
5½*	23.38	10–12
6	25.50	10–12
7*	29.75	10–12
8*	34.00	10–12
1½x2	10.20	10–12
2½	12.75	10–12
3	15.30	10–12
3½	17.85	10–12
4	20.40	10–12
4½	22.95	10–12
5	25.50	10–12
6	30.60	10–12
7	35.70	10–12
8	40.80	10–12
10*	51.00	10–12
1¾x2*	11.90	10–12
2¼*	13.39	10–12
3	17.85	10–12
3¾*	22.31	10–12
5½*	32.73	10–12
2 x2½	17.00	10–12
3	20.40	10–12
3½	23.80	10–12
4	27.20	10–12
4½*	30.60	10–12

FLATS—Continued on Next Page

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for
Annealing, page 294.
Size, page 292.
Quantity, page 294.
Cutting, page 296.

STENTOR

(OIL-HARD)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
2 x5	34.00	10–12
6	40.80	10–12
7	47.60	10–12
8*	54.40	10–12
2½x3	25.50	10–12
3½	29.75	10–12
4	34.00	10–12
5	42.50	10–12
6	51.00	10–12
3 x4	40.80	10–12
4½*	45.90	10–12
5*	51.00	10–12
6*	61.20	10–12
3½x4½*	53.55	10–12
5*	59.50	10–12
4 x6*	81.60	10–12
5 x6*	102.00	10–12

SQUARES

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
⅜*	.48	10–12
½	.85	10–12
⅝*	1.33	10–12
¾	1.91	10–12
1	3.40	10–12
1⅛*	4.30	10–12
1¼	5.31	10–12
1½	7.65	10–12
1¾	10.41	10–12
2	13.60	10–12
2¼	17.21	10–12
2½	21.25	10–12
2¾*	25.71	10–12
3	30.60	10–12
3½	41.65	10–12
4	54.40	10–12

ROUNDS

¼*	.17	10–12
5/16*	.26	10–12
⅜	.38	10–12
7/16*	.51	10–12
½	.67	10–12
9/16*	.85	10–12
⅝	1.04	10–12
11/16*	1.26	10–12
¾	1.50	10–12
13/16*	1.76	10–12
⅞	2.04	10–12
15/16*	2.35	10–12
1	2.67	10–12
1 1/16*	3.01	10–12
1⅛	3.38	10–12
1 3/16*	3.77	10–12
1¼	4.17	10–12
1 5/16*	4.60	10–12
1⅜	5.05	10–12
1 7/16*	5.52	10–12
1½	6.01	10–12
1⅝	7.05	10–12
1¾	8.18	10–12
1⅞	9.39	10–12
2	10.68	10–12
2⅛	12.06	10–12
2¼	13.52	10–12
2⅜	15.06	10–12
2½	16.69	10–12
2⅝	18.40	10–12
2¾	20.20	10–12
2⅞	22.07	10–12

ROUNDS

3	24.03	10–12
3⅛*	26.08	10–12
3¼	28.21	10–12
3⅜*	30.42	10–12
3½	32.71	10–12
3⅝*	35.09	10–12
3¾	37.55	10–12
3⅞*	40.10	10–12
4	42.73	10–12
4¼	48.23	10–12
4⅜*	51.11	10–12
4½	54.08	10–12
4⅝*	57.12	10–12
4¾	60.25	10–12
5	66.76	10–12
5⅛*	70.14	10–12
5¼*	73.60	10–12
5½	80.78	10–12
5¾*	88.29	10–12
6	96.13	10–12
6¼*	104.31	10–12
6½	112.82	10–12
7	130.85	10–12
7½*	150.21	10–12
8⅛	176.29	10–12
9*	216.30	10–12
10*	267.04	10–12

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

iladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260
R. D. S.
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

R. D. S.

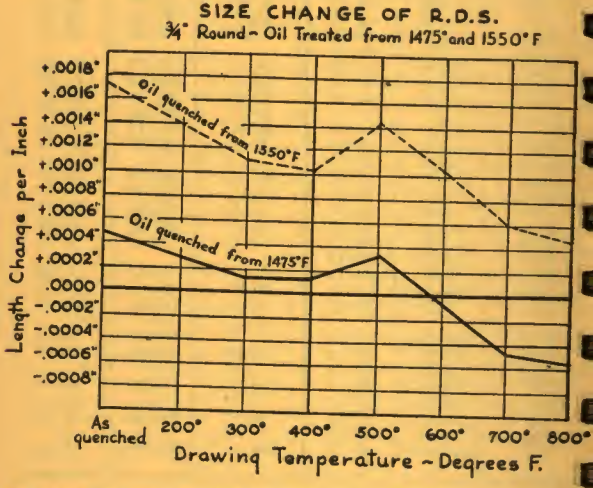
(OIL-TOUGH)

Type Analysis:	Carbon	.75%
	Manganese	.30%
	Silicon	.25%
	Chromium	1.00%
	Nickel	1.75%

PROPERTIES

DESCRIPTION: A tool steel containing a large percentage of nickel is so unusual that *R. D. S.* might well be expected to have unusual properties. And so it does. *R. D. S.* possesses approximately the same toughness as *Solar* (WATER-TOUGH) combined with non-deforming properties like *Stentor* (OIL-HARD). In the short time that *R. D. S.* has been available as a member of the Oil Hardening Matched Set, it has licked so many difficult tooling jobs that tool makers are now wondering why no one ever thought of a **tough** non-deforming tool steel before.

DEFORMATION IN HARDENING: The accompanying chart shows typical length changes for *R. D. S.* when quenched from 1475° F. and also when quenched from 1550° F. (See Hardening instructions.) At 1475° F.,



a piece 1″ long should expand about .0005″ upon quenching, and when drawn between 300° and 400° F. should come back practically to its original size. Higher hardening heats produce a slight expansion in size.

Sizes carried in stock—page 191.

R. D. S.
(OIL-TOUGH)

DECARBURIZATION: *R. D. S.* has no special tendency to decarburize. If the hardening instructions are carefully followed, the tools should be hard right out to the surface.

MACHINABILITY: *R. D. S.* machines a little tough like *Solar*. It would be rated as intermediate between a plain carbon, water-hardening tool steel and High Speed Steel.

USES: *R. D. S.* is used in three ways—

1. As the tough member of the Oil-Hardening Matched Set, it is used to replace *Stentor* (OIL-HARD) for all tools that require more toughness than *Stentor* possesses. - Thus you will find it used for special taps, punches, blanking or forming dies, trimmer dies, thread roller dies, forming rolls, embossing dies, etc.
2. As the oil-hardening running mate of *Solar* (WATER-TOUGH) *R. D. S.* is used for all tools that would ordinarily be made of *Solar*. Where hardening accuracy or cracking hazards make an oil-hardening steel necessary, such as intricate shear blades, punches, stamps, swaging dies, slitting shears, etc.—use *R. D. S.* Furthermore, since *R. D. S.* is not as subject to surface decarburization as *Solar*, this alone would be a reason for using it sometimes in place of *Solar*.
3. For parts that are not tools at all. There are certain machine parts requiring great strength and toughness combined with hardness and wear resistance such as clutch parts, flipper pins, heavy duty lathe centers, pawls, dogs, stops, knuckle pins, spindles, fingers, indexing pins, clutch pins, etc. Since *R. D. S.* is "harder than tempered gear steel and tougher than tool steel," it is ideal for parts of this nature.

WHEN TO SWITCH FROM R. D. S.:

If size change is not important—if no cracking hazard is involved in hardening, there is no need to use *R. D. S.*—use *Solar* (WATER-TOUGH).

If greater hardness and wear resistance are needed—and you have toughness to spare—use *Stentor*.

If the tools get hot in service, switch to a Red-Hard Steel—*Excelo* or *D. Y. O.*

THE HEAT TREATMENT OF R. D. S.

To Forge: Forge from a temperature not over 2000° F. and allow the forgings to cool in air in a dry place.

To Normalize: Forgings are normalized by heating to 1675° F. and cooling in air.

To Anneal: For parts that have been previously hardened or annealed—pack in a suitable container with clean

Sizes carried in stock—page 191.

Philadelph
REGent 74
Park 535

Baltimore
Vernon 82

R. D. S.
(OIL-TOUGH)

cast iron borings, heat uniformly to 1400° to 1450° F. and cool slowly in the furnace.

For forgings—first normalize as above, then anneal from 1275° to 1300° F. and cool slowly. Packing is hardly necessary for this low anneal.

To relieve machining strains for greater accuracy in hardening—first, rough machine, then anneal **below the critical** (from 1275° to 1300° F.) and cool slowly—then finish machine.

To Harden: The hardening temperature range for *R. D. S.* lies between 1475° and 1550° F. Greatest **accuracy** is secured by hardening from 1475°/1500° F. (See curves under DEFORMATION IN HARDENING.) Greatest toughness and freedom from cracking hazard is secured by hardening from 1525° to 1550° F. Thus each part should be hardened according to your desire for maximum accuracy—or maximum toughness.

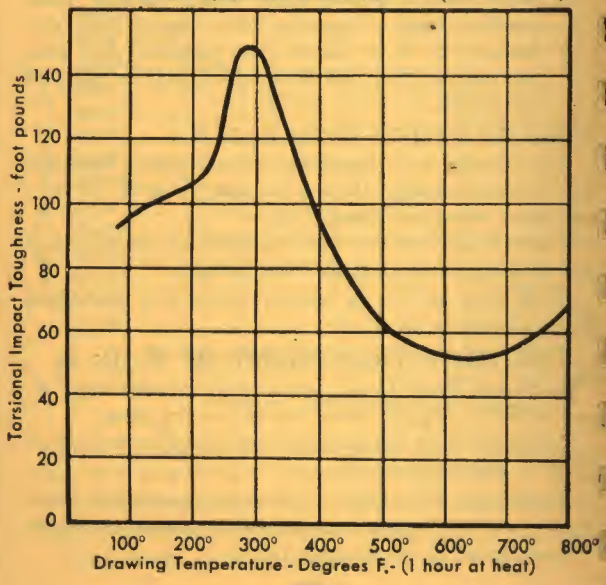
To Draw: The effect of different drawing temperatures on the torsional impact toughness and hardness of *R. D. S.* is shown below.

Effect of Drawing Temperatures on Hardness
R. D. S.—Oil Quenched from 1475° F.—Drawn One Hour

Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope	Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope
As hardened	C-60/61	85	500° F.	52/53	71
200° F.	59/60	83	600° F.	50/51	68
300° F.	**58/59**	**82**	700° F.	47/48	63
400° F.	55/56	76	800° F.	44/45	57

The best drawing temperature to secure maximum combination of hardness and toughness is 300° F.

Effect of Drawing Temperature on Toughness
R. D. S. — Oil Quenched from 1475° F. - (drawn 1 hour)



R. D. S.

(OIL-TOUGH)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
⅛x ¼*	.11	10–12
⅜x1*	1.28	10–12
2*	2.55	10–12
3*	3.83	10–12
½x1*	1.70	10–12
2*	3.40	10–12
3*	5.10	10–12
4*	6.80	10–12
6*	10.20	10–12
⅝x1½*	3.19	10–12
2*	4.25	10–12
2½*	5.31	10–12
3*	6.38	10–12
3½*	7.44	10–12
4*	8.50	10–12
5*	10.63	10–12
¾x1¼*	3.19	10–12
1½*	3.83	10–12
2*	5.10	10–12
2¼*	5.74	10–12
2½*	6.38	10–12
3*	7.65	10–12
4*	10.20	10–12
6*	15.30	10–12
1 x1¼*	4.25	10–12
1½*	5.10	10–12
2*	6.80	10–12
2½*	8.50	10–12
3*	10.20	10–12
4*	13.60	10–12
5*	17.00	10–12
6*	20.40	10–12
1¼x2*	8.50	10–12
3*	12.75	10–12
4*	17.00	10–12
5*	21.25	10–12
6*	25.50	10–12
1½x2*	10.20	10–12
3*	15.30	10–12
4*	20.40	10–12
5*	25.50	10–12
6*	30.60	10–12
2 x3*	20.40	10–12
4*	27.20	10–12
5*	34.00	10–12
6*	40.80	10–12
2¼x6*	45.90	10–12
2½x6*	51.00	10–12

ROUNDS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
¼*	.17	10–12
5/16*	.26	10–12
⅜*	.38	10–12
7/16*	.51	10–12
½*	.67	10–12
9/16*	.85	10–12
⅝*	1.04	10–12
11/16*	1.26	10–12
¾*	1.50	10–12
13/16*	1.76	10–12
⅞*	2.04	10–12
15/16*	2.35	10–12
1*	2.67	10–12
1 1/16*	3.01	10–12
1⅛*	3.38	10–12
1¼*	4.17	10–12
1⅜*	5.05	10–12
1½*	6.01	10–12
1⅝*	7.05	10–12
1¾*	8.18	10–12
1⅞*	9.39	10–12
2*	10.68	10–12
2⅛*	12.06	10–12
2¼*	13.52	10–12
2⅜*	15.06	10–12
2½*	16.69	10–12
2¾*	20.20	10–12
3*	24.03	10–12
3¼*	28.21	10–12
3½*	32.71	10–12
3¾*	37.55	10–12
4*	42.73	10–12
4¼*	48.23	10–12
4½*	54.08	10–12
5*	66.76	10–12
5¼*	73.60	10–12
5½*	80.78	10–12
6*	96.13	10–12

SQUARES

½*	.85	10–12
⅝*	1.33	10–12
¾*	1.91	10–12
1*	3.40	10–12
1¼*	5.31	10–12
1½*	7.65	10–12
1¾*	10.41	10–12
2*	13.60	10–12

*Sizes thus marked Reading, Pa., stock.

See Tool Steel Extras for
Annealing, page 294.
Size, page 292.
Quantity, page 294.
Cutting, page 296.

Philadelphia
CGent 7450
Park 5351
Baltimore
rnon 8260
HAMPDEN
STAR-ZENITH
D. Y. O.
EXCELO
DRILL RODS
STAINLESS AND AT RESISTING STEELS
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelph
REGent 74
Park 535
Baltimore
Vernon 826

HAMPDEN
(OIL-WEAR)

Type Analysis:	Carbon	2.10%
	Manganese	.25%
	Silicon	.25%
	Chromium	12.50%
	Nickel	.50%

PROPERTIES

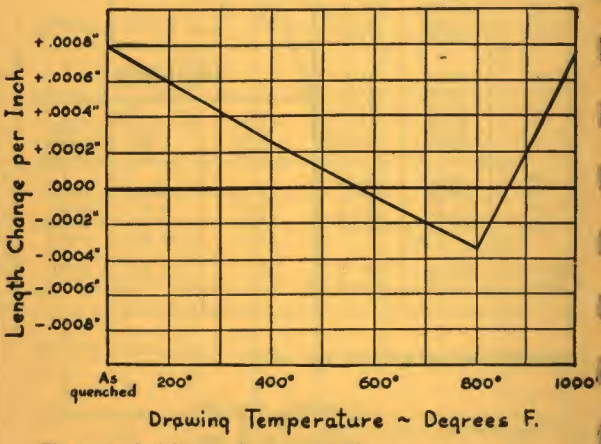
DESCRIPTION: *Hampden* is an oil-hardening, high carbon, high chromium die steel having extreme wear resistance. It hardens with very little change in size or shape. *Hampden* is a deep hardening steel like High Speed tool steel and has a very high compressive strength.

Because of its high percentage of chromium, *Hampden* has mild corrosion resisting properties when hardened.

Fracture of 1" Rd. *Hampden* O. T. 1775° F.

DEFORMATION IN HARDENING: *Hampden* is essentially a non-deforming tool steel. Its average behavior is illustrated by the chart. For example, a piece 1" long would expand about .0008" in hardening, but when drawn at 400° F., it returns within .0002" of its original length. If drawn at 800° F., it will be a shade under size and above this it expands again.

SIZE CHANGE OF HAMPDEN
¾" Round ~ Oil quenched from 1775° F.



Sizes carried in stock—page 196.

HAMPDEN
(OIL-WEAR)

If *Hampden* is overheated in hardening, it will shrink very badly—hence it must never be hardened above 1825° F.

DECARBURIZATION: If hardened in an open furnace *Hampden* **may** acquire a slight soft skin. This is not due to any sensitive elements in the analysis—but results from the high hardening temperature itself. Pack hardening is recommended to avoid this.

MACHINABILITY: Due to the very high carbon and chromium, *Hampden* cannot be annealed softer than about 217 to 241 Brinell. At this hardness, it machines about like annealed high speed steel.

USES OF HAMPDEN: *Hampden* is used for tools requiring a combination of hardening accuracy and safety with maximum wear resistance and greatest possible production. On the Matched Diagram, *Hampden* may be approached from two directions.

1. Use *Hampden* to replace *Stentor* (OIL-HARD) for any tools requiring exceptionally long life or for working on abrasive materials—such as

Broaches	Edging rolls
Slitting cutters	Sub-press dies
Special taps	Forming dies
Master tools	Fender dies
Beading rolls	Thread rolling dies
Forming rolls	Lamination dies

2. *Hampden* is the oil-hardening running mate of *K-W* (WATER-WEAR). Use *Hampden* to replace *K-W* for all tools that must hold size and shape accurately—or where the shape makes water quenching dangerous, such as:

Thread gauges	Drawing dies	Intricate punches
Spinning tools	Extrusion dies	Blanking dies
Long mandrels	Reamers	Trimming dies
Long punches	Sizing plugs	Special stamps

WHEN TO SWITCH FROM HAMPDEN:

If you want greater toughness, at the sacrifice of wear resistance, switch to *Stentor* (OIL-HARD). A second step would be to go to *R. D. S.* (OIL-TOUGH).

If the tool does **not** require accuracy in hardening, and is safe to quench in water, use *K-W* (WATER-WEAR). *K-W* will usually show even greater wear resistance and longer life than *Hampden*.

If you prefer an **air-hardening** high carbon, high chromium steel to one which hardens in oil, use No. 610 Air Hardening Steel. This is not on the Matched Diagram but it can be used almost interchangeably with *Hampden*

Sizes carried in stock—page 196.

hiladelphia
EGent 7450
Park 5351
Baltimore
rnon 8260

Philadelph
REC ent 74
Park 535
Baltimore
Vernon 826

HAMPDEN

(OIL-WEAR)

for all purposes for which *Hampden* is recommended. (See Page 197 for description of No. 610 Steel.)

THE HEAT TREATMENT OF HAMPDEN

To Forge: *Hampden* forges very much like high speed steel. Heat slowly and uniformly to a temperature between 1950° and 2050° F. and forge. Do not continue forging below 1700° F. but reheat as often as necessary. Small, simple forgings can be cooled slowly in lime, but the best practice for large forgings is to place them in a furnace heated to about 1550° F., soak uniformly at this heat, then shut off the heat and cool the job slowly in the furnace. This is **not** an anneal. To anneal, proceed as below.

Normalizing: Normalizing is not recommended and is not necessary after furnace cooling as described above.

To Anneal: Pack in a suitable container with clean cast iron borings, heat uniformly to 1500° to 1530° F., and cool **very slowly** in the furnace. Brinell hardness 217 to 241.

To Harden: The following table shows the effect of different hardening temperatures on *Hampden:*

Oil quenched from	Rockwell Hardness
1650° F.	C-61/63
1700° F.	64/65
1750° F.	65/66
1800° F.	65/66
1850° F.	61/63
1950° F.	54/56

Note that maximum hardness is secured **only** between 1750° and 1800° F. Also *Hampden* holds size best within this range. If overheated *Hampden* becomes softer—it shrinks—and it becomes somewhat non-magnetic. Moral—**Don't overheat it.**

The best procedure is to pack the tools in clean cast iron borings (or charcoal), heat uniformly to 1750° to 1800° F., soak thoroughly, then remove the tools from the pack and quench in oil.

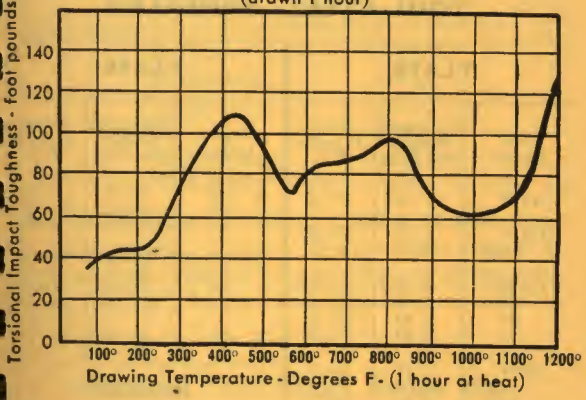
To Draw: The effect of different drawing temperatures upon the torsional impact toughness and hardness of *Hampden* is shown on the following page.

Sizes carried in stock—page 196.

HAMPDEN

(OIL-WEAR)

EFFECT OF DRAWING TEMPERATURE ON TOUGHNESS
HAMPDEN—Pack Hardened from 1775° F. in Oil
(drawn 1 hour)



For description of Torsion Impact Testing, see page 159.

EFFECT OF DRAWING TEMPERATURES ON HARDNESS

HAMPDEN—Pack Hardened from 1775° in Oil—
Drawn One Hour

Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope
As hardened	C-65/66	94
200° F.	64/66	93
300° F.	63/64	90
400° F.	62/63	88
600° F.	59/60	83
800° F.	58/59	82
1000° F.	51/53	70
1200° F.	37/39	51

It will be observed that *Hampden* shows **two** toughness peaks—one at 400° F. and the other at 800° F.

To secure maximum hardness and wear resistance with fair toughness, draw at 400° F. To get greater toughness at some sacrifice of hardness, jump directly up to 800° F. There appears to be little gained by drawing *Hampden* anywhere between 425° and 775° F.

Tool makers who prefer an air-hardening, high-carbon, high-chromium tool steel are referred to No. 610 Air Hardening Steel described on page 197.

Sizes carried in stock—page 196.

hiladelphia
EGent 7450
'ark 5351
Baltimore
rnon 8260
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS
STAR-ZENITH
D. Y. O.
EXCELO

HAMPDEN

(OIL-WEAR)

TOOL STEEL—ANNEALED

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
¼x1*	.85	10–12
⅜x1*	1.28	10–12
1¾*	2.23	10–12
½x ¾*	1.28	10–12
1*	1.70	10–12
2*	3.40	10–12
4*	6.80	10–12
⅝x1*	2.13	10–12
1¼*	2.66	10–12
1⅝*	3.45	10–12
1¾*	3.72	10–12
2*	4.25	10–12
¾x1*	2.55	10–12
1¾*	4.46	10–12
⅞x1⅜*	4.09	10–12
2½*	7.44	10–12
1 x1½*	5.10	10–12
2*	6.80	10–12
2½*	8.50	10–12
3*	10.20	10–12
4*	13.60	10–12
5*	17.00	10–12
6*	20.40	10–12
1¼x1½*	6.38	10–12
2*	8.50	10–12
3*	12.75	10–12
4*	17.00	10–12
5*	21.25	10–12
6*	25.50	10–12
7*	29.75	10–12
1½x1¾*	8.93	10–12
2*	10.20	10–12
2¼*	11.48	10–12
2½*	12.75	10–12
3*	15.30	10–12
3½*	17.85	10–12
4*	20.40	10–12
5*	25.50	10–12
6*	30.60	10–12
7*	35.70	10–12
8*	40.80	10–12
2 x2¼*	15.30	10–12
2½*	17.00	10–12
3 *	20.40	10–12
3½*	23.80	10–12
4 *	27.20	10–12

FLATS

Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
2 x5*	34.00	10–12
6*	40.80	10–12
7*	47.60	10–12
2½x3*	25.50	10–12
3½*	29.75	10–12
4*	34.00	10–12
5*	42.50	10–12
3 x4*	40.80	10–12

ROUNDS

¼*	.17	10–12
5/16*	.26	10–12
⅜*	.38	10–12
½*	.67	10–12
9/16*	.85	10–12
⅝*	1.04	10–12
¾*	1.50	10–12
⅞*	2.04	10–12
1*	2.67	10–12
1¼*	4.17	10–12
1⅜*	5.05	10–12
1½*	6.01	10–12
1⅝*	7.05	10–12
1¾*	8.18	10–12
1⅞*	9.39	10–12
2*	10.68	10–12
2¼*	13.52	10–12
2⅜*	15.06	10–12
2½*	16.69	10–12
2⅝*	18.40	10–12
2¾*	20.20	10–12
2⅞*	22.07	10–12
3*	24.03	10–12
3⅛*	26.08	10–12
3¼*	28.21	10–12
3½*	32.71	10–12
3¾*	37.55	10–12
4*	42.73	10–12
4¼*	48.23	10–12
4½*	54.08	10–12
4¾*	60.25	10–12
5*	66.76	10–12
5½*	80.78	10–12

SQUARES

½*	.85	10–12
¾*	1.91	10–12
1*	3.40	10–12
1¼*	5.31	10–12
1½*	7.65	10–12
2*	13.60	10–12
2½*	21.25	10–12
3*	30.60	10–12

*Sizes thus marked Reading, Pa., stock.

See High Speed Steel Extras for { Annealing, page 294. Size, page 293. Quantity, page 294. Cutting, page 297.

No. 610 AIR-HARDENING STEEL

Although it does not appear on the Matched Diagram, this steel is mentioned here because it is so frequently used by certain tool makers who prefer an air-hardening high-carbon, high-chromium tool steel.

The type analysis of No. 610 Steel is:

Carbon	1.50%
Manganese	.30%
Silicon	.30%
Chromium	12.00%
Molybdenum	.80%
Vanadium	.20%

No. 610 does not become quite as hard as *Hampden* but it is correspondingly tougher. A tool maker can, if he desires, substitute No. 610 for *Hampden* on his Matched Diagram and use it for the same purposes as he would use *Hampden*.

THE HEAT TREATMENT OF No. 610

To Forge: Same as *Hampden*. See Page 194.

To Anneal: Same as *Hampden*. See Page 194.

To Harden: Pack harden from 1825° to 1875° F., remove the tool from the pack and cool in air. A blast is not necessary.

To Draw: The torsion impact curve for No. 610 is quite similar to *Hampden*. It shows two toughness peaks—the lower one occurs at 450° F. and the higher one at 700° F. The hardness values are shown in the following table.

EFFECT OF DRAWING TEMPERATURE ON HARDNESS

No. 610—Pack Hardened from 1850° in Air—Drawn One Hour

Drawing Temperature	Rockwell Hardness	Equivalent Scleroscope
As hardened	C-62/63	88
200° F.	61/62	86
400° F.	59/60	83
450° F.	**59/60**	**83**
550° F.	56/57	77
700° F.	**55/56**	**76**
800° F.	56/57	77
900° F.	58/59	82
1000° F.	59/60	83
1100° F.	57/58	80
1200° F.	44/45	58

The best drawing temperature for practically all purposes is 450° F. However, greater toughness can be secured by drawing at 700° F. with some sacrifice of hardness.

hiladelphia
Gent 7450
ark 5351
altimore
rnon 8260
DRILL RODS
STAINLESS AND AT RESISTING STEELS
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS
STAR-ZENITH
D. Y. O.
EXCELO

STAR-ZENITH
HIGH-SPEED STEEL
(RED-WEAR)

Type Analysis:	Carbon	.70%
	Manganese	.25%
	Silicon	.20%
	Chromium	3.75%
	Tungsten	18.50%
	Vanadium	1.10%

PROPERTIES

DESCRIPTION: *Star-Zenith* is nominally an 18-4-1 type of High Speed Steel. That is—18% tungsten, 4% chromium, 1% vanadium. However, we do not shoot for 18% tungsten—and get some 17.50's and 17.25's. *Star-Zenith* is always **over** 18% tungsten. So, too, with vanadium—1% is our minimum.

The normal carbon range for 18-4-1 is .65% to .75%. Not so with *Star-Zenith*. You will get no 65's or 66's in this grade. Our carbons are a minimum of .68%—and practically all heats are within a point or two of .72% carbon.

This close control of chemical limits permits a constant duplication of heat treating results that would not otherwise be possible.

DEFORMATION IN HARDENING: *Star-Zenith* holds size very accurately in hardening. For example, a 1″ cube will lose about .0005″ in hardening from 2300° to 2400° F., and will lose a like amount upon being drawn to 1050° to 1100° F. The hardened and drawn piece will run about .001″ smaller than the annealed block. Cutters and form tools will open up slightly in the hole and shrink slightly on the O. D.

DECARBURIZATION: *Star-Zenith* is particularly free from the tendency to decarburize in hardening. Soft skin is unknown to hardeners who use ordinary care in handling this steel.

MACHINABILITY: The machinability of high speed steel is too well known to require comment. *Star-Zenith* is very carefully and thoroughly annealed to produce the best machinability possible in this type of steel.

USES OF STAR-ZENITH: It is *Star-Zenith's* job to deliver maximum hardness and wear resistance for tools.

Sizes carried in stock—pages 201-202.

STAR-ZENITH
HIGH-SPEED STEEL
(RED-WEAR)

that get hotter than about 300° F. in service. Although it is frequently used with success for tools that never become heated at all, this is not its proper field and there is usually some other steel of the Matched Set that will do such jobs better or more economically.

Star-Zenith is the red-hard running mate of *K-W* (WATER-WEAR). There is no more wear resisting steel in existence than *K-W,* but it will lose its hardness and efficiency if heated above about 300° F. in service. The rule of the Matched Diagram is to go **east** for red-hardness and here you find *Star-Zenith.*

Star-Zenith is the **only** steel on the Matched Diagram suitable for making metal cutting tools that become hot in service. It is recommended for:

Lathe tools	Reamers	Thread chasers
Planer tools	Broaches	End mills
Drills	Milling cutters	Gear cutters
Taps	Form cutters	Wood knives

As the most wear resisting member of the Red-Hard Matched Set, *Star-Zenith* plays a small part in other types of hot working tools. When drawn at temperatures between 1200° and 1400° F., it has some ductility and is useful for certain hot working tools that have flat or convex working surfaces, such as hot shear blades, hot punches, grading roll inserts, flat coining dies, etc. Tools of this nature made of *Star-Zenith* should not be water-cooled during service.

WHEN TO SWITCH FROM STAR-ZENITH:

If the tool does **not** become heated in service—and red-hardness is not necessary—*K-W* or *Hampden* will usually do the job more efficiently or more economically.

If greater toughness is needed than can be secured in *Star-Zenith* by drawing it down to C-45 Rockwell, switch to *D. Y. O.* (Red-Hard).

THE HEAT TREATMENT OF STAR-ZENITH

To Forge: Heat **slowly** and **uniformly** to 1900°/2050° F. and forge. Do not work the steel below 1600° F. but reheat as often as necessary. Small, simple forgings can be cooled slowly in lime, but the best practice for large forgings is to place them in a furnace heated to about 1550°/1600° F., soak uniformly at this heat, then shut off the heat and cool the job slowly in the furnace. This is **not** an anneal, and when cold the forging must be annealed as below.

Normalizing: Normalizing is not recommended.

To Anneal: Pack in a suitable container with clean cast iron borings, heat uniformly to 1550° to 1600° F., and cool **very** slowly in the furnace. Brinell hardness 217 to 241.

Sizes carried in stock—pages 201-202.

hiladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260

STAR-ZENITH
HIGH-SPEED STEEL
(RED-WEAR)

To Harden: Preheat slowly and uniformly to 1500° to 1600° F. and soak a reasonable time to heat the section throughout. Transfer to a super heating furnace with a **reducing** atmosphere at 2300° to 2400° F.—avoid soaking at the superheating temperature—and quench in oil. Small sizes or delicate sections, or large hot-work dies may be hardened by cooling in still air.

The average hardness values to be secured at various hardening temperatures are given in the table below.

Be sure to quench *Star-Zenith* tools **below** 200° F. before drawing them.

To Draw: It will be observed that Torsion Impact curves are not included for the three Red-Hard Steels. These steels are intended for use at elevated temperatures, and thus far, our toughness tests have all been made on specimens at room temperature. We cannot be sure that such toughness data would be applicable at elevated temperatures.

We have much Torsion Impact data on *Star-Zenith* which would be helpful to a hardener who wished to experiment with his heat treatment—and this will gladly be furnished upon request.

Most metal cutting tools made of *Star-Zenith* High Speed Steel should be drawn at 1025° to 1100° F.

The effect of various hardening and drawing temperatures on the Rockwell hardness of *Star-Zenith* is given in the following table:

Effect of Hardening and Drawing Temperatures on the Hardness of Star-Zenith

(Rockwell C Scale)

Drawing Temperature One Hour at Heat	HARDENING TEMPERATURE—QUENCHED IN OIL				
	2000° F.	2100° F.	2200° F.	2300° F.	2400° F.
As hardened	C-56	C-61	C-63	C-66	C-65
100° F.	57	61	63.5	66	65
200° F.	57.5	61	64	65.5	65
300° F.	57.5	61	64	65	65
400° F.	57.5	60.5	63	64	62.5
500° F.	57	59	61.5	62	60
600° F.	56	58	60	60.5	60
700° F.	55	58	60	60	60.5
800° F.	55	58	60	60.5	62
900° F.	55	58	60	62	63
1000° F.	55	58	60	62.5	64
1100° F.	53	57	60	62.5	64
1200° F.	46	50	53	56	57
1300° F.	39	41	43	47	49

To secure greater toughness on *Star-Zenith* cutting tools, the Torsion Impact data suggests a draw for 8 hours

Sizes carried in stock—pages 201-202.

STAR-ZENITH
HIGH-SPEED STEEL
(RED-WEAR)

at 900° F. This will yield about C-64 Rockwell hardness with a greater measured toughness than a one hour draw at 1050° to 1100° F.

Hot forming tools made of *Star-Zenith* should be drawn softer than C-55 Rockwell so that they will have a slight degree of ductility. The tools may even be drawn down to C-45 Rockwell for this purpose—but no softer. If this is not tough enough, switch to *D. Y. O.* (RED-HARD), which hardens to about C-45 Rockwell and will be much tougher than the *Star-Zenith* at this hardness. Such hot forming tools, when made of *Star-Zenith*, are usually air-hardened, and from a lower temperature than cutting tools—namely 2100° to 2300° F.

STAR-ZENITH
HIGH-SPEED STEEL—ANNEALED
(RED-WEAR)

ROUNDS			ROUNDS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
1/4*	.19	10–12	2 3/8*	16.72	10–12
5/16*	.29	10–12	2 7/16*	17.61	10–12
3/8*	.42	10–12	2 1/2*	18.53	10–12
13/32*	.49	10–12	2 9/16*	19.46	10–12
7/16*	.57	10–12	2 5/8*	20.42	10–12
1/2*	.74	10–12	2 3/4*	22.42	10–12
9/16*	.94	10–12	2 13/16*	23.45	10–12
5/8*	1.16	10–12	2 7/8*	24.50	10–12
11/16*	1.40	10–12	2 15/16*	25.58	10–12
3/4*	1.67	10–12	3*	26.68	10–12
13/16*	1.96	10–12	3 1/16*	27.80	10–12
7/8*	2.27	10–12	3 1/8*	28.95	10–12
15/16*	2.61	10–12	3 1/4*	31.31	10–12
1*	2.96	10–12	3 3/8*	33.76	10–12
1 1/16*	3.35	10–12	3 1/2*	36.31	10–12
1 1/8*	3.75	10–12	3 5/8*	38.95	10–12
1 3/16*	4.18	10–12	3 3/4*	41.68	10–12
1 1/4*	4.63	10–12	3 7/8*	44.51	10–12
1 5/16*	5.11	10–12	4*	47.43	10–12
1 3/8*	5.60	10–12	4 1/8*	50.44	10–12
1 7/16*	6.12	10–12	4 1/4*	53.54	10–12
1 1/2*	6.67	10–12	4 3/8*	56.73	10–12
1 9/16*	7.24	10–12	4 1/2*	60.02	10–12
1 5/8*	7.83	10–12	4 5/8*	63.40	10–12
1 11/16*	8.44	10–12	4 3/4*	66.88	10–12
1 3/4*	9.08	10–12	5*	74.10	10–12
1 13/16*	9.74	10–12	5 1/8*	77.85	10–12
1 7/8*	10.42	10–12	5 3/8*	85.63	10–12
1 15/16*	11.13	10–12	5 1/2*	89.66	10–12
2*	11.86	10–12	5 5/8*	93.79	10–12
2 1/16*	12.61	10–12	5 3/4*	98.00	10–12
2 1/8*	13.38	10–12	6*	106.71	10–12
2 3/16*	14.18	10–12	6 1/8*	111.19	10–12
2 1/4*	15.01	10–12	6 1/2*	125.23	10–12
2 5/16*	15.85	10–12			

*Sizes thus marked Reading, Pa., stock.

hiladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260
DRILL RODS
STAINLESS AND AT RESISTING STEELS
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS
D. Y. O.
EXCELO

Philadelph
REGent 74
Park 535

Baltimore
Vernon 82

STAR-ZENITH

HIGH-SPEED STEEL—ANNEALED

(RED-WEAR)

FLATS			FLATS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
3/16x1*	.71	10–12	5/8x1*	2.36	10–12
			1¼*	2.95	10–12
¼x ½*	.47	10–12	1½*	3.54	10–12
¾*	.71	10–12	1¾*	4.13	10–12
1*	.94	10–12	2*	4.72	10–12
1¼*	1.18	10–12	2¼*	5.31	10–12
1½*	1.42	10–12	2½*	5.90	10–12
1¾*	1.65	10–12	3*	7.08	10–12
2*	1.89	10–12	4*	9.44	10–12
			4¼*	10.02	10–12
5/16x ½*	.59	10–12			
⅝*	.74	10–12	¾x1*	2.83	10–12
¾*	.88	10–12	1¼*	3.54	10–12
⅞*	1.03	10–12	1½*	4.25	10–12
1*	1.18	10–12	1¾*	4.95	10–12
1¼*	1.47	10–12	2*	5.66	10–12
			2¼*	6.37	10–12
⅜x ½*	.71	10–12	2½*	7.08	10–12
⅝*	.88	10–12			
¾*	1.06	10–12	⅞x1¼*	4.13	10–12
⅞*	1.24	10–12	1½*	4.95	10–12
1*	1.42	10–12	1¾*	5.78	10–12
1⅛*	1.59	10–12	2*	6.60	10–12
1¼*	1.77	10–12			
1⅜*	1.95	10–12	1 x1¼*	4.72	10–12
1½*	2.12	10–12	1½*	5.66	10–12
			1¾*	6.60	10–12
7/16x ¾*	1.24	10–12	2*	7.55	10–12
1*	1.65	10–12	2¼*	8.49	10–12
1⅛*	1.86	10–12	2½*	9.44	10–12
1¼*	2.06	10–12	3*	11.32	10–12
1½*	2.48	10–12	4*	15.10	10–12
½x ¾*	1.42	10–12	1¼x1½*	7.08	10–12
⅞*	1.65	10–12	1¾*	8.26	10–12
1*	1.89	10–12	2*	9.44	10–12
1¼*	2.36	10–12	2½*	11.79	10–12
1⅜*	2.60	10–12	3*	14.15	10–12
1½*	2.83	10–12			
1¾*	3.30	10–12	1½x2*	11.32	10–12
2*	3.77	10–12	2½*	14.15	10–12
2¼*	4.25	10–12	3*	16.98	10–12
2½*	4.72	10–12	4*	22.64	10–12
⅝x ¾*	1.77	10–12	2 x3*	22.64	10–12
⅞*	2.06	10–12	3½*	26.42	10–12

SQUARES			SQUARES		
¼*	.24	10–12	1*	3.77	10–12
5/16*	.37	10–12	1¼*	5.90	10–12
⅜*	.53	10–12	1½*	8.49	10–12
7/16*	.72	10–12	1¾*	11.56	10–12
½*	.94	10–12			
⅝*	1.47	10–12	2*	15.10	10–12
¾*	2.12	10–12	2¼*	19.11	10–12
⅞*	2.89	10–12	2½*	23.59	10–12

*Sizes thus marked Reading, Pa., stock.

See High Speed Steel Extras for { Annealing, page 294. Size, page 293. Quantity, page 294. Cutting, page 297.

STAR-ZENITH
HIGH-SPEED STEEL
(RED-WEAR)
HARDENED BITS

Star-Zenith high speed steel is furnished in the form of standard tool-holder bits with 30 degree angle ends. Each piece is hardened, ready to be ground and put to work. The cutting edge should be ground at least 1/64" below the surface of the bit.

These are not "trick" bits; they are not made to cut at abnormally fast speeds or high temperature. They combine good red-hardness, good toughness and the ability to hold a keen edge for finishing. They are ideal tool bits for general shop use—cutting all kinds of metal—on all kinds of operations—either roughing or finishing.

Star-Zenith tool bits are furnished from stock in 5-pound boxes one size or assorted sizes in a box.

SQUARES
TO FIT STANDARD TOOL HOLDERS

Size Inches	Estimated Weight Per Piece Ounces	Number Per Pound Approximate	Stock Lengths Inches
3/16	.33	50	2½
1/4	80	21	2½
5/16	1.25	14	2½
3/8	2.25	8	3
7/16	3.64	5	3½
1/2	5.00	3	4
5/8	9.00	2	5
3/4	14.00	1	5
7/8*	19.10		5
1*	34.93		7

GOLD STAR
HARDENED BITS

GOLD STAR is a super high speed cutting steel designed for machining at temperatures beyond the capacity of the standard brands of high speed steel. Whether the excessive temperature on the cutting edge of the tool results from high speeds, heavy feeds, or hard material, if your present tools are "burning up"—try GOLD STAR. This steel is available in annealed flat and square bars—also treated tool holder bits in standard sizes.

SQUARES
TO FIT STANDARD TOOL HOLDERS

Size Inches	Estimated Weight Per Piece Ounces	Number Per Pound Approximate	Stock Lengths Inches
3/16	.33	50	2½
1/4	.80	21	2½
5/16	1.25	14	2½
3/8	2.25	8	3
7/16	3.64	5	3½
1/2	5.00	3	4
5/8	9.00	2	5
3/4	14.00	1	5
7/8*	19.10		5
1*	34.93		7

*Sizes thus marked Reading, Pa., stock.

hiladelphia
Gent 7450
ark 5351
altimore
rnon 8260
DRILL RODS
STAINLESS AND AT RESISTING STEELS
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS
D. Y. O.
EXCELO

D. Y. O.

(RED-HARD)

Type Analysis:	Carbon	.30%
	Manganese	.30%
	Silicon	.25%
	Chromium	4.00%
	Tungsten	14.50%
	Vanadium	.50%

PROPERTIES

DESCRIPTION: *D. Y. O.* is an all-around hot working die steel for use in the forge shop. Its analysis shows it to be a low carbon high speed steel. The high alloy content gives it red-hardness and wear resistance at elevated temperatures. The low carbon serves to balance this with sufficient toughness to make a good general purpose hot working die steel.

DEFORMATION IN HARDENING: *D. Y. O.* behaves very much like high speed steel in this respect. It holds size and shape very accurately within the limits that are expected in hot working tools such as it is used for.

DECARBURIZATION: *D. Y. O.* is not subject to surface decarburization in hardening providing even ordinary care is given to its heating.

MACHINABILITY: *D. Y. O.* machines very much like high speed steel—if anything, it is a little softer.

USES OF D. Y. O.: The principal field for the steel is in hot **compression** tools. It does not become hard enough for metal cutting tools—and it lacks the extreme toughness needed in tools subjected to a sharp hammer blow. It is recommended for bolt and rivet dies, hot piercing punches, hot extrusion dies, bulldozer tools, forging mandrels, semi-hot work dies, etc.

WHEN TO SWITCH FROM D. Y. O.:

If the tools do not become heated over 300° F. in service, some steel from the Water-Hardening or Oil-Hardening Matched Sets will probably serve better.

If greater red-hardness and wear resistance is needed switch to *Star-Zenith* (RED-WEAR). *Star-Zenith* can be drawn back to C-45 Rockwell in order to meet the hardness of *D. Y. O.*

If greater toughness is needed than can be secured by drawing *D. Y. O.* to 1300° F., switch to *Excelo* (RED-TOUGH).

Sizes carried in stock—page 206.

D. Y. O.
(RED-HARD)

If it is a short run job, *Excelo* will probably do it at lower cost.

THE HEAT TREATMENT OF D. Y. O.

To Forge: Heat slowly and uniformly to a temperature not over 2100° F. and forge. Do not work the steel below 1600° F., but reheat as often as necessary. When finished, the forging should be thoroughly reheated to about 1550°/1600° F. and then cooled slowly—the slower the better. This is **not** an anneal, and when the forging is cold, it must be annealed as below.

Normalizing: Normalizing is not recommended.

To Anneal: Pack in a suitable container with clean cast iron borings, heat uniformly to 1550° F., and cool slowly in the furnace. Brinell hardness 197 to 223.

To Harden: *D. Y. O.* is hardened by the same practice that would be used for high speed steel.

The tools should be preheated slowly and uniformly to 1500°/1600° F., and thoroughly soaked at this temperature until they are well heated throughout. Sometimes two preheating operations are used—first in a furnace maintained at about 1100° F., then transferred to a second preheating furnace at 1600° F.

After preheating, transfer the tools to a super-heating furnace at 2250° to 2300° F. When heated uniformly to this temperature, quench in oil. Air hardening can be used in some cases where the resulting scale is not too objectionable.

To Draw: The following table shows the average Brinell and Rockwell Hardnesses to be expected with various drawing temperatures:

EFFECT OF DRAWING TEMPERATURES ON D. Y. O.

Oil quenched from 2250° F.

Drawing Temperature One Hour at Heat	Rockwell Hardness	Brinell Hardness
As hardened	C-45	415
200° F.	45	415
300° F.	44	401
400° F.	44	401
500° F	44	388
600° F	43	388
700° F	43	388
800° F	44	388
900° F	45	401
1000° F.	45	401
1100° F.	46	415
1200° F.	45	401
1300° F.	43	388

It will be observed that there is a secondary hardness peak corresponding to a drawing temperature of 1100° F.

Sizes carried in stock—page 206.

D. Y. O.

(RED-HARD)

At this point the steel is just as hard as it was when quenched.

There is, therefore, no occasion for drawing *D. Y. O.* Steel at a **lower** temperature than 1100° F. Higher temperatures than this should be used when greater toughness is desired.

The tools can be left harder for any given service if the forger will take time to warm his tools thoroughly before putting them to work. Cold dies are likely to break on the first piece forged and it is a pity to require the hardener to draw the tools back tough enough to withstand these first few blows and thus sacrifice hardness and wear resistance that will be urgently needed when the dies have warmed up.

D. Y. O.

(RED-HARD)

TOOL STEEL—ANNEALED

ROUNDS			ROUNDS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
½*	.73	10–12	2*	11.70	10–12
¾*	1.65	10–12	2⅛*	13.21	10–12
⅞*	2.24	10–12	2¼*	14.81	10–12
			2⅜*	16.50	10–12
1*	2.92	10–12	2½*	18.28	10–12
1¼*	4.57	10–12	2¾*	22.12	10–12
1⅜*	5.53	10–12			
1½*	6.58	10–12	3*	26.33	10–12
1⅝*	7.72	10–12	3¼*	30.90	10–12
1¾*	8.96	10–12	3½*	35.83	10–12
1⅞*	10.28	10–12			
			4*	46.80	10–12

*Sizes thus marked Reading, Pa., stock.

See High Speed Steel Extras for { Annealing, page 294. Size, page 293. Quantity, page 294. Cutting, page 297.

EXCELO
(RED-TOUGH)

Type Analysis:	Carbon	.55%
	Manganese	.40%
	Silicon	.30%
	Chromium	1.50%
	Tungsten	2.50%
	Vanadium	.35%

PROPERTIES

DESCRIPTION: The analysis of *Excelo* is arranged to give maximum toughness for hot working tools. As much red-hard alloy is added as is possible without decreasing the great toughness which characterizes this steel.

Excelo is a deep hardening steel. It becomes much harder than *D. Y. O.* in the quenched condition but it loses its hardness faster when used at elevated temperatures.

DEFORMATION IN HARDENING: Being an oil-hardening steel, *Excelo* holds shape and size well in hardening. No difficulty need be anticipated from this direction in hot working tools such as are made from this steel.

DECARBURIZATION: *Excelo* is not particularly susceptible to decarburization in hardening. It is more sensitive than carbon tool steel—because of its higher hardening heat—but with reasonable care in heating, it will harden satisfactorily on the surface.

MACHINABILITY: This steel machines intermediate between water-hardening tool steel and high speed steel. It is the easiest of the Red-Hard Matched Set to machine.

USES OF EXCELO: *Excelo* is used for hot working tools requiring the greatest possible toughness—particularly tools subjected to heavy hammer blows or tools containing deep recesses or sharp corners. For short-run jobs, *Excelo* can be used with economy for the same tools as recommended for *D. Y. O.* (RED-HARD). It has proved very successful for square bolt dies, bulldozer dies, Maxipres dies and hot shear blades having notched edges.

WHEN TO SWITCH FROM EXCELO:

If the tools do not become hot in service, the use of a red-hard steel is not advised. *Solar* (WATER-TOUGH) or *R. D. S.* (OIL-TOUGH) will usually do a better job and cost less.

Sizes carried in stock—page 209.

EXCELO

(RED-TOUGH)

If more red-hardness and wear resistance at elevated temperatures is needed, use *D. Y. O.* This change becomes increasingly necessary as the tool temperature increases.

THE HEAT TREATMENT OF EXCELO

To Forge: Forge from a temperature not over 2050° F. Cool the forgings in air in a dry place.

To Normalize: Forgings are normalized by heating to 1700° F. and cooling in air.

To Anneal: Pack in a suitable container with clean cast iron borings, heat uniformly to 1440° to 1475° F. and cool slowly in the furnace. Brinell hardness 197 to 223.

To Harden: Slow preheating is not as essential on *Excelo* as it is on the higher tungsten tools which do not have so much toughness. It is, however, good practice to preheat the tools on the fore-hearth of the furnace until they have acquired a dull red color, then heat to 1700° F., soak for sufficient time to heat thoroughly and quench in oil.

To Draw: *Excelo* tools should be drawn at least as hot as they will become in service—generally somewhat hotter.

The following table gives average hardness values to be expected at various drawing temperatures:

EFFECT OF DRAWING TEMPERATURES ON EXCELO

Oil quenched at 1700° F.

Drawing Temperature One Hour at Heat	Rockwell Hardness	Brinell Hardness
As hardened	C-61	653
200° F.	60	627
300° F.	59	627
400° F.	57	601
500° F.	55	578
600° F.	54	555
700° F.	52	534
800° F.	51	514
900° F.	48	477
1000° F.	49	477
1100° F.	48	461
1200° F.	45	429
1300° F.	35	321

There is slight evidence of secondary hardness at a drawing temperature of 1000° F. Experience shows that *Excelo* should seldom be drawn lower than this temperature.

It is easy to become confused by the high hardness values of *Excelo* compared to *D. Y. O.* This is due to the fact that these hardness values are taken at room temperature and that is **not** where the dies do their work. *D. Y. O.* Steel is only slightly softened by high operating temperature while *Excelo* is considerably softened. Therefore,

Sizes carried in stock—page 209.

EXCELO
(RED-TOUGH)

when the tools are actually at work at say 1000° F., *D. Y. O.* is harder than *Excelo*. Also, the wear resistance of *D. Y. O.* is considerably greater due to its high alloy content.

Starting at a minimum drawing temperature of 1000° F., greater toughness in *Excelo* can be secured by raising the drawing temperature if experience indicates that this is necessary.

EXCELO
(RED-TOUGH)
TOOL STEEL—ANNEALED

ROUNDS			ROUNDS		
Size Inches	Estimated Weight Per Foot	Stock Lengths Feet	Size Inches	Estimated Weight Per Foot	Stock Lengths Feet
½*	.68	10–12	2*	10.84	10–12
¾*	1.52	10–12	2¼*	13.72	10–12
⅞*	2.07	10–12	2½*	16.94	10–12
			2¾*	20.50	10–12
1*	2.71	10–12			
1¼*	4.24	10–12	3*	24.39	10–12
1½*	6.10	10–12	3¼*	28.63	10–12
1⅝*	7.16	10–12	3½*	33.20	10–12
1¾*	8.30	10–12	3¾*	38.12	10–12
1⅞*	9.53	10–12			
			4*	43.37	10–12
			6*	97.57	10–12

*Sizes thus marked Reading, Pa., stock.

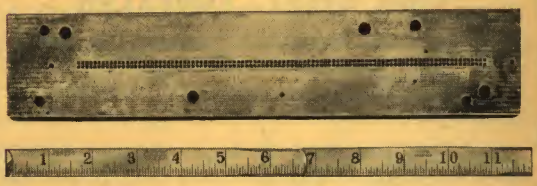
See Tool Steel Extras for { Annealing, page 294. Size, page 292. Quantity, page 294. Cutting, page 296.

A FEW MONEY SAVERS WITH STENTOR

MACHINABILITY

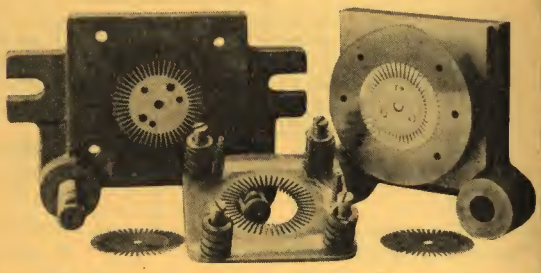
SAVING—A 20% saving in machining time is not an unusual claim to be made by users of STENTOR steel.

SAFETY IN HARDENING



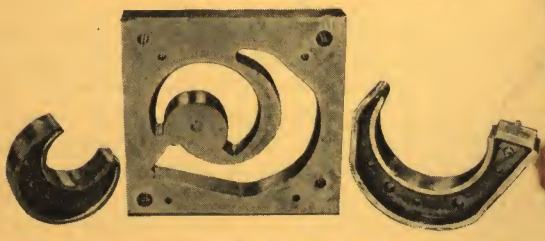
SAVING—The time and expense of remaking dies that crack in hardening or break down in service.

STENTOR HOLDS ITS SIZE



SAVING—The cost of a sectional die ground all over. The usual hours of stoning to fit.

STENTOR HOLDS ITS SHAPE



SAVING—Many hours of tedious grinding, stoning and adjusting.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

DRILL RODS

POTTS SPECIAL

Characteristics:

Specially processed to be uniform in quality and machinability. Polished to insure accuracy of size and straightness.

Noted for its even response to heat treatment.

Uses:

Arbors, armature shafts, roller bearings, broaches, cams, cutting-off tools, small drills, engravers' tools, jewelers' tools, punches, reamers, spindles, taps, twist drills, etc.

POTTS EXTRA SPECIAL
HIGHEST QUALITY

Uses:

Recommended for tool work of the most intricate nature, especially for punches, broaches, drills and similar parts, where high production is required.

POTTS HIGH SPEED

For jobs where the service conditions warrant a change to a drill rod of high speed quality Can be furnished promptly from mill stock.

DRILL RODS
STAINLESS AND HEAT RESISTING STEELS
FENCES
INDEX
Technical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS SPECIAL
DRILL RODS
ROUNDS

Use list price less discount

Size	Decimal	List Price	Estimated Weight Per Foot	Size	Decimal	List Price	Estimated Weight Per Foot
1 1/2	1.500	$0.55	6.000	U	.368	$0.60	.362
1 15/32	1.4687	.55	5.753	23/64	.3593	.60	.344
1 7/16	1.4375	.55	5.512	T	.358	.60	.342
1 13/32	1.4062	.55	5.274	S	.348	.60	.325
1 3/8	1.375	.55	5.073	11/32	.3437	.60	.313
1 11/32	1.3437	.55	4.815	R	.339	.60	.308
1 5/16	1.3125	.55	4.583	Q	.332	.60	.294
1 9/32	1.2812	.55	4.374	21/64	.3281	.60	.287
1 1/4	1.250	.55	4.167	P	.323	.60	.277
1 7/32	1.2187	.55	3.937	O	.316	.60	.271
1 3/16	1.1875	.55	3.771	5/16	.3125	.60	.260
1 5/32	1.1562	.55	3.565	N	.302	.65	.242
1 1/8	1.125	.55	3.333	19/64	.2968	.65	.234
1 3/32	1.0937	.55	3.208	M	.295	.65	.233
1 1/16	1.0625	.55	3.010	L	.290	.65	.225
1 1/32	1.0312	.55	2.833	9/32	.2812	.65	.213
1	1.000	.55	2.666	K	.281	.65	.212
63/64	.9843	.55	2.583	J	.277	.65	.205
31/32	.9687	.55	2.531	I	.272	.65	.198
61/64	.9531	.55	2.416	H	.266	.65	.188
15/16	.9375	.55	2.333	17/64	.2656	.65	.187
59/64	.9218	.55	2.262	G	.261	.65	.181
29/32	.9062	.55	2.188	F	.257	.65	.174
57/64	.8906	.55	2.118	E	.250	.65	.167
7/8	.875	.55	2.042	1/4	.250	.65	.167
55/64	.8593	.55	1.970	D	.246	.70	.161
27/32	.8437	.55	1.896	C	.242	.70	.154
53/64	.8281	.55	1.828	B	.238	.70	.150
13/16	.8125	.55	1.750	15/64	.2343	.70	.147
51/64	.7968	.55	1.708	A	.234	.70	.147
25/32	.7812	.55	1.625	1	.227	.75	.138
49/64	.7656	.55	1.562	2	.219	.75	.129
3/4	.750	.55	1.500	7/32	.2187	.75	.129
47/64	.7343	.55	1.438	3	.212	.80	.121
23/32	.7187	.55	1.375	4	.207	.80	.115
45/64	.7031	.55	1.312	5	.204	.80	.109
11/16	.6875	.55	1.250	13/64	.2031	.80	.109
43/64	.6718	.55	1.187	6	.201	.85	.107
21/32	.6562	.55	1.145	7	.199	.85	.106
41/64	.6406	.55	1.104	8	.197	.85	.104
5/8	.625	.55	1.042	9	.194	.85	.099
39/64	.6093	.55	1.000	10	.191	.85	.096
19/32	.5937	.55	.937	11	.188	.85	.094
37/64	.5871	.55	.891	3/16	.1875	.85	.094
9/16	.5625	.55	.833	12	.185	.95	.092
35/64	.5468	.55	.797	13	.182	.95	.089
17/32	.5312	.55	.750	14	.180	.95	.087
33/64	.5156	.55	.709	15	.178	.95	.085
1/2	.500	.55	.667	16	.175	.95	.082
31/64	.4843	.60	.625	17	.172	.95	.079
15/32	.4687	.60	.583	11/64	.1718	1.05	.078
29/64	.4531	.60	.542	18	.168	1.05	.076
7/16	.4375	.60	.500	19	.164	1.05	.072
27/64	.4218	.60	.472	20	.161	1.05	.069
Z	.413	.60	.458	21	.157	1.05	.066
13/32	.4062	.60	.437	5/32	.1562	1.05	.066
Y	.404	.60	.427	22	.155	1.15	.065
X	.397	.60	.421	23	.153	1.15	.063
25/64	.3906	.60	.407	24	.151	1.15	.061
W	.386	.60	.400	25	.148	1.15	.059
V	.377	.60	.383	26	.146	1.15	.057
3/8	.375	.60	.375	27	.143	1.15	.055

Standard lengths, 3 feet. Intermediate sizes to order in quantities not less than 50 pounds of each size.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

POTTS SPECIAL

DRILL RODS

ROUNDS

Use list price less discount

Size	Decimal	List Price	Estimated Weight Per Foot	Size	Decimal	List Price	Estimated Weight Per Foot
9/64	.1406	$1.15	.052	53	.058	$2.75	.009
28	.139	1.30	.052	54	.055	2.75	.008
29	.134	1.30	.048	55	.050	2.75	.007
30	.127	1.30	.043	3/64	.0468	3.50	.006
1/8	.125	1.30	.042	56	.045	3.50	.006
31	.120	1.45	.039	57	.042	3.50	.005
32	.115	1.45	.036	58	.041	3.50	.0045
33	.112	1.45	.034	59	.040	3.50	.0043
34	.110	1.45	.032	60	.039	5.00	.0040
7/64	.1093	1.45	.031	61	.038	5.00	.0038
35	.108	1.60	.031	62	.037	5.00	.0037
36	.106	1.60	.030	63	.036	5.00	.0035
37	.103	1.60	.029	64	.035	5.00	.0033
38	.101	1.60	.028	65	.033	5.00	.0029
39	.099	1.60	.026	66	.032	5.00	.0027
40	.097	1.60	.025	1/32	.0312	5.00	.0026
41	.095	1.60	.024	67	.031	5.00	.0025
3/32	.0937	1.75	.023	68	.030	7.50	.0024
42	.092	1.75	.023	69	.029	7.50	.0023
43	.088	1.75	.021	70	.027	7.50	.0020
44	.085	1.75	.019	71	.026	7.50	.0018
45	.081	1.75	.018	72	.024	11.00	.0015
46	.079	1.75	.017	73	.023	11.00	.0014
5/64	.0781	1.75	.017	74	.022	11.00	.0013
47	.077	2.25	.016	75	.020	17.00	.0011
48	.075	2.25	.015	76	.018	17.00	.0009
49	.072	2.25	.014	77	.016	35.00	.0007
50	.069	2.25	.013	1/64	.0156	35.00	.0007
51	.066	2.25	.012	78	.015	35.00	.0006
52	.063	2.25	.011	79	.014	35.00	.0005
1/16	.0625	2.25	.010	80	.013	35.00	.0004

SQUARES

Size	Decimal	List Price	Estimated Weight Per Foot	Size	Decimal	List Price	Estimated Weight Per Foot
1/16	.0625	$2.25	.0132	5/16	.3125	$0.60	.332
3/32	.0937	1.75	.030	11/32	.3437	.60	.402
1/8	.125	1.30	.053	3/8	.375	.60	.478
5/32	.1562	1.05	.083	13/32	.4062	.60	.561
3/16	.1875	.85	.120	7/16	.4375	.60	.651
7/32	.2187	.75	.163	1/2	.500	.55	.850
1/4	.250	.65	.212	5/8	.625	.55	1.328
9/32	.2812	.65	.269	3/4	.750	.55	1.913
				1	1.000	.55	3.400

Standard lengths, 3 feet. Intermediate sizes to order in quantities not less than 50 pounds of each size.

Sizes 53 to 80 not carried in Potts Special, can be supplied in Potts Extra Special.

STAINLESS AND
AT RESISTING STEELS
FENCES
INDEX
hnical Data
AUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

INDEX
OF STAINLESS AND HEAT RESISTING STEELS

GENERAL INFORMATION

Pages

STAINLESS PRODUCTS 215

DESCRIPTION OF GRADES 216-217

TYPE NUMBERS AND ANALYSES 218

PHYSICAL PROPERTIES 219

CORROSION DATA 220-226

FABRICATION DATA 227-233

CASTINGS 234

THICKNESS AND WEIGHT TOLERANCES ... 241

PIPE FITTING DIMENSIONS 250

STOCK LIST — SEE PAGES 235-259, INCLUSIVE

GRADES, SIZES AND FINISHES NOT LISTED

While the following pages contain data of the several types, sizes and finishes available for Immediate Shipment from our warehouse stock, ALWAYS CONSULT us for grades or sizes *not* listed; as with the rapidly widening use of Stainless Steels we are constantly adding to our present unusually comprehensive stock of every form of Stainless Steel. If not in stock our mill connections are so close and active that we can often secure prompt delivery for even a special size or analysis.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

STAINLESS AND HEAT RESISTING STEELS

Even though Stainless Steels have been in use for several years, there is still considerable confusion existing as to the properties and correct applications of the many analyses of corrosion resisting steels.

"Stainless Steel" is a general term, embracing many analyses, each one developed for some particular purpose. It is obvious that with so many different types, a wrong application—that is, the use of a wrong type—will jeopardize the usefulness of the steel. *We are in a position to give expert advice on application and fabrication.*

Horace T. Potts Co. have been pioneers in the development and sale of special steels and can supply Stainless Steel in all available forms in the correct analysis for the purpose intended. The mills for whom we are distributors are among the leading producers of the various forms of Stainless and Heat Resisting Steels, such as:

SHEETS AND LIGHT PLATES

STRIP

PLATES

TUBES and PIPE—Seamless, Welded and Clad

FITTINGS—Screwed, Flanged and Compression.

BARS—Hot Rolled, Cold Finished and Ground—Annealed or Treated

SHAPES—Angles, Channels and Structurals

SEMI-FINISHED PRODUCTS—Flanged and Dished Heads, etc.

FORGINGS

WIRE—Straight Lengths or Coils

WELDING WIRE—Gas and Electrodes

CASTINGS—Corrosion and Heat Resisting.

BOLTS, NUTS, RIVETS, WASHERS, NAILS, SCREWS, ETC.

Our Engineering Service is available for solving your corrosion and heat resisting problems.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

STAINLESS AND HEAT RESISTING STEELS

18-8 Type 302

Type Analysis: Carbon .10%; Chromium 16-20%; Nickel 8-12%.

18-8 is unsurpassed in resistance to corrosion and will remain permanently bright and untarnished under many conditions. It is not affected by moisture, salt water, milk, fruit-juice, or foodstuffs. A large variety of chemical solutions and liquids used in the industrial field has no effect upon 18-8. It has excellent resistance to high temperatures, scaling comparatively little below 1600°-1650° F.

18-8 offers the maximum ease in stamping, forming, and welding operations, and may be readily soldered.

18-8 S Type 304

This type differs from 18-8 Type 302 only because of its low carbon content. The carbon in this grade may be specified as low as .07% max. Where considerable welding is to be done and where the corrosive conditions are not severe, Type 304 makes possible a higher corrosion resistance at the weld and adjacent material due to less carbide precipitation in and around the weld area.

18-8 FM Type 303

This alloy has all the desirable characteristics of the regular 18-8 Stainless Steel, but it does not have its difficult machinability. The 18-8 FM (Free-Machining Alloy) is so freely machinable that it can be readily handled on automatic screw machines at 60 to 70% of the speed of ordinary screw stock. The improvement of machinability is obtained without loss of corrosion resistance or physical properties.

18-8 FM Stainless—Free-Machining Type is available promptly in a wide variety of sizes and shapes, and in all finishes, Hot Rolled, Cold Drawn, Ground and Ground and Polished.

18-8 S MO Type 316

Type Analysis: Carbon .10% max.; Chromium 16 to 19%; Ni. 14% max.; Molybdenum 2 to 4%.

A superior corrosion resistant to many of the heavy chemicals. Used extensively for Dye Vats and Sulphuric Acid Equipment. Having excellent Resistance to Inter-Granular Corrosion, is used for many fabricating jobs requiring welding.

18-8 Ti Type 321

A stabilized 18-8 Stainless Steel containing Titanium. This type makes heat treatment after welding unnecessary and eliminates carbide precipitation adjacent to the weld areas.

25-12 Type 309

Type Analysis: Carbon .28% max.; Chromium 22-28%; Nickel 12-16%.

25-12, while highly resistant to a wide variety of corrosion agents, is intended primarily for use at high temperatures. It does not oxidize rapidly below 2100° F., and in addition, retains a large proportion of its strength and toughness throughout its range of application. 25-12 is an outstanding development in heat resistant alloys and will stand more forming and manipulation than the straight chromium alloys.

17 Type 430

Type Analysis: Carbon .10%; Chromium 16-18%.

This is the leading member of the straight chromium alloy series for general purposes, and is widely used in many arts and industries. It resists atmospheric corrosion indefinitely, also many chemicals, and withstands temperatures as high as 1500° F. without scaling.

17 is suggested for conditions when the extreme ductility and great ease in fabrication of 18-8 is not necessary.

12 Type 410

Type Analysis: Carbon .10%; Chromium 12-14%.

This is a straight chromium alloy which may be heat treated to high physical properties. Heat treatment also improves corrosion resistance. It finds many applications in machine parts, such as shafts, pump rods, bolts, etc.

12-Z Type 416

This alloy offers all the characteristics obtainable with the regular 12/14 straight Chrome type of Stainless Alloy, and in addition is a free-machining steel that will machine in automatics at approximately the same speed, and with the same tooling, as ordinary screw stock. It also grinds rapidly, saves abrasives and has special non-galling and non-seizing properties. This alloy may be heat treated to a hardness of about 331 Brinell.

12-Z Stainless—Free-Machining Type is available promptly in a wide variety of sizes and shapes, and in all finishes, Hot Rolled, Cold Drawn, Ground and Ground and Polished.

27 Type 446

Type Analysis: Carbon .10%; Chromium 25-30%.

A high chromium steel, used principally for service at temperatures between 1500° and 2100° F. It is used for furnace parts, air and gas pre-heating, annealing boxes, exhaust manifold valve, etc.

The Stainless and Heat Resisting grades and Type numbers briefly described on these pages are the most popular analyses and they cover the largest field of applications. There are, however, many other grades and we will welcome the opportunity to send you complete data on all types as well as more detailed information on the steels shown.

CONSULT US ON ALL YOUR STAINLESS STEEL REQUIREMENTS

Philadelpl
REGent 74
Park 535

Baltimore
Vernon 8260

STAINLESS AND HEAT RESISTING STEEL GRADES

GRADE DESIGNATIONS, STANDARD TYPE NUMBERS AND ANALYSES

Grade Designation	Type No.	Carbon	Chrome	Nickel	Other Elements
17-7	301X	.10-.20	16.00-17.50	7.00- 8.50	
18-8	302	Over .08-.20	17.50-19.00	8.00- 9.00	
18-8 B	302B	Over .08-.20	17.50-19.00	8.00- 9.00	Si 2.00-3.00
18-8 FM	303	.20 Max.	17.50-19.00	8.00- 9.00	S or Se .07 Min. or Mo .60 Max.
18-8 S	304	.08 Max.	17.50-19.00	8.00- 9.00	
19-9	305	Over .08-.20	18.00-20.00	9.00-10.00	
19-9 S	306	.08 Max.	18.00-20.00	9.00-10.00	
20-10	307	Over .08-.20	20.00-22.00	10.00-12.00	
20-10 S	308	.08 Max.	20.00-22.00	10.00-12.00	
25-12	309	.20 Max.	22.00-26.00	12.00-14.00	
25-20	310	.25 Max.	24.00-26.00	19.00-21.00	
20-25	311	.25 Max.	19.00-21.00	24.00-26.00	
29-9	312	.25 Max.	27.00-31.00	8.00-10.00	
	315	.15 Max.	17.00-19.00	7.00- 9.50	Cu 1.00-1.50 Mo 1.00-1.50
18-8 S MO	316	.10 Max.	16.00-19.00	14.00 Max.	Mo 2.00-4.00
19-9 S MO	317	.10 Max.	18.00-20.00	14.00 Max.	Mo 3.00-4.00
18-8 Ti	321	.10 Max.	17.00-20.00	7.00-10.00	Ti Min. 4 x C
	325	.25 Max.	7.00-10.00	19.00-23.00	Cu 1.00-1.50
	327	.25 Max.	25.00-30.00	3.00- 5.00	
	329	.10 Max.	25.00-30.00	3.00- 5.00	Mo 1.00-1.50
15-35	330	.25 Max.	14.00-16.00	33.00-36.00	
	343	Over .25	12.00-16.00	12.00-16.00	W 3.00
18-8 Cb	347	.10 Max.	17.00-20.00	8.00-12.00	Cb 10 x C
	403	.12 Max.	11.50-13.00		Turbine Quality
	405	.08 Max.	11.50-13.50		Al .10-.20
	406	.12 Max.	12.00-14.00		Al 4.00-4.50
12	410	.12 Max.	10.00-13.50		
	414	.12 Max.	10.00-13.50	2.00 Max.	
12-Z	416	.12 Max.	12.00-14.00	-	S or Se .07 Min. or Mo .60 Max.
	418	.12 Max.	12.00-14.00		W 2.50-3.50
	420	Over .12	12.00-14.00		
	420F	Over .12	12.00-14.00		S or Se .07 Min. or Mo .60 Max.
17	430	.12 Max.	14.00-18.00		
17 FM	430F	.12 Max.	14.00-18.00		S or Se .07 Min. or Mo .60 Max.
	431	.12 Max.	14.00-18.00	2.00 Max.	
	434A	.12 Max.	14.00-18.00		Si 1.00 Cu 1.00
	438	.12 Max.	16.00-18.00		W 2.50-3.50
	439	.50-.65	8.00		W 8.00
	440	Over .12	14.00-18.00		
	441	Over .15	14.00-18.00	2.00 Max.	
	442	.35 Max.	18.00-23.00		
27	446	.35 Max.	23.00-30.00		
	501	Over .10	4.00- 6.00		
	502	.10 Max.	4.00- 6.00		

NOMINAL PROPERTIES OF USS STAINLESS and HEAT RESISTING STEELS

Material in the Annealed Condition Unless Otherwise Noted.
Data Compiled by U. S. Steel Corporation Research Laboratory, April, 1933

Physical Properties	USS 18-8	USS 25-12	USS 12	USS 17	USS 27
Specific Gravity					
lb./cu. in.	0.286	0.283	0.276	0.273	0.270
low carbon steel = 1.00	**1.01**	**1.0**	**0.97**	**0.96**	**0.95**
Specific Electrical Resistance					
microhms/cm.³	70 (cold worked = 70–82)	78	57	59	67
microhms/in.³	27.6 (cold worked = 27.6–32.3)	30.7	22.4	23.2	26.4
low carbon steel = 1.00	**6.4**	**7.1**	**5.2**	**5.4**	**6.1**
Melting Range, °F.	2550–2590	2530–2570	2750–2790	2710–2750	2710–2750
Structure	Austenitic	Austenitic	Ferritic	Ferritic	Ferritic
Magnetic Permeability					
as annealed	$\mu = 1.003$	$\mu = 1.003$	Ferromagnetic	Ferromagnetic	Ferromagnetic
after 10% reduction of area	$\mu = 1\ 10$	$\mu = 1.003$	Ferromagnetic	Ferromagnetic	Ferromagnetic
Specific Heat					
cal./°C./gm. (0 to 100°C.)	0.12	0.12	0.11	0.11	0.11
B.t.u./°F./lb. (32 to 212°F.)	0.12	0.12	0.11	0.11	0.11
low carbon steel = 1.00 (0 to 100°C.)	**1.1**	**1.1**	**1.0**	**1.0**	**1.0**
Thermal Conductivity					
cal./cm.²/sec./°C./cm., at 100°C.	0.0390	0.03–0.04	0.0595	0.0583	0.0500
B.t.u./sq. ft./hr./°F./in., at 212 °F.	113	87–116	173	169	145
low carbon steel = 1.00, at 100°C.	**0.33**	**0.25–0.34**	**0.50**	**0.49**	**0.42**
cal./cm.²/sec./°C./cm., at 500°C.	0.0515	.....	0.0686	0.0624	0.0583
B.t.u./sq. ft./hr./°F./in., at 932°F.	150	.....	199	181	169
Coefficient of Thermal Expansion					
per °F. $\times 10^{-6}$ (32 to 212°F.)	9.6	8.3	6.1	6.0	5.9
low carbon steel = 1.00 (32 to 212°F.)	**1.45**	**1.26**	**0.93**	**0.91**	**0.90**
per °F. $\times 10^{-6}$ (32 to 932°F.)	10.2	9 6	...	6.7	6.3

Mechanical Properties at Room Temperature	Annealed	Cold Worked (Wire)	Annealed	Cold Worked (Wire)	Annealed	Quenched and Drawn at 1100°F.	Annealed	Cold Worked (Wire)	Annealed	Cold Worked (Wire)
Tensile Strength, 10³ lb./sq. in.	80–95	105–300	90–110	110–270	65	125	75	100–190	75–95	85–175
Yield Point, 10³ lb./sq. in.	35–45	60–250	40–60	65–230	35	100	40	....	50–60	55–155
Modulus of Elasticity, 10⁶ lb./sq. in.	29	.....	.....	.....	28	....	29	.....	.....	.....
Elongation in 2 in., %	55–60	50–2 (10″)	35–50	35–2 (10″)	35	20	27	25–2 (10″)	20–30	25–2 (10″)
Reduction of Area, %	55–65	65–30	45–60	55–20	65	60	55	40–20	50–60	55–25
Charpy Impact Strength, ft.-lb.	.....	.....	.....	.....	.....	75	.....	....	....	....
Izod Impact Strength, ft.-lb.	75–110	.....	....	....	80	....	8–25	....	....	....
Endurance Limit (Fatigue), 10³ lb./sq. in.	47	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brinell Hardness Number	135–185	170–460	150–185	170–375	140	230	175	185–270	160–190	150–250
Rockwell Hardness Number	B75–90	C5–47	B80–90	C5–40	B76	C22	B85	B90–105	B80–90	C0–25
Erichsen Value, mm.	11–14	.....	.....	.....	.....	.....	7–9	....	.....	.....
Stress Causing 1% Elong'n (Creep) in 10,000 Hrs.										
At 1000°F., lb./sq. in.	17000		13000				8500		....	
At 1200°F., lb./sq. in.	7000		2300				2100		1600	
At 1350°F., lb./sq. in.	3000		1400				1200		400	
At 1500°F., lb./sq. in.	850		.....				.....		.....	
Scaling Temperature, °F. (approximate)	1650	2100	1300				1550		2100	
Initial Forging Temperature, °F.	2200	2200–2300	2100				2000		2200	
Finishing Temperature, °F.	Not under 1600–1700	Not under 1600–1700	Not over 1450				Not over 1400		Not over 1400–1450	
Annealing Treatment	Heat to 1900–2000°F. and quench	Heat to 2000–2150°F. and Quench	Prolonged Heating at 1250–1350°F.				(A)		Heat one hour or more at 1450°F. and Quench	
Precautions	(B)	(B)	(C)				(D)		(D)	

(A) Anneal at 1400°F. after a small cold reduction, and quench.

(B) Preheat slowly to 1600°F., then heat rapidly to the forging or annealing temperature. Exposure to temperatures between 1000 and 1500°F. produces marked susceptibility to intergranular corrosion. If the metal is unattacked, this can be cured by repeating the annealing treatment.

(C) Preheat slowly to 1450°F., then heat rapidly to 2100°F. for forging. Full corrosion resistance is developed only in the heat treated condition. (Temper below 1000°F.)

(D) In forging, preheat slowly to 1450°F. Excessive grain growth takes place above 2000°F. Expert welding is required to avoid excessive grain growth. Prolonged exposure at 850 to 950°F. produces cold brittleness. To prevent this, heat to 1400°F. before cooling, and quench.

Corrosion Data | Fabrication Data | Castings | Stock Lists → | Sheets Plates | Bars Angles | Pipe and Tubes | Fittings Valves | Bolts, Nuts, etc. Welding Rods

FENCES
INDEX
Technical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
RIdgeway 7450
Mark 5351
Baltimore
Lexington 8260

Philadelpl
REGent 74
Park 535

Baltimore
Vernon 8260

LABORATORY CORROSION DATA

Showing resistance of USS Stainless Steels to various chemicals and acids

The following data are results of laboratory tests conducted by Fried Krupp, A. G. In using this data it should be understood that results of laboratory tests are indicative only of the conditions under which they are run, and may be considered as a basis for recommendation, but not for guarantee. As actual operating conditions can rarely be duplicated in the laboratory it is desirable to further test under actual service. The letters A, B, C, etc., represent the approximate corrosion expressed in inches penetration per month as follows:

Fully Resistant	A Less than .00035	inches penetration per month
Satisfactorily Resistant	B .00035-.0035	inches penetration per month
Fairly Resistant	C .0035 -.010	inches penetration per month
Slightly Resistant	D .010 -.035	inches penetration per month
Not Resistant	E Over .035	inches penetration per month

Substance Condition	Temp. F.	USS 18-8	USS 18-8 Mo	USS 17	USS 12
Acetic Acid					
5% Agitated	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
10% Agitated	70°	A	A	A	A
10% Aerated	70°	A	A	A	A
20% Agitated	70°	A	A	A	C
20% Aerated	70°	A	A	A	C
50%	70°	A	A	..	..
50%	Boiling	C	B	..	..
80%	70°	A	A	..	..
80%	Boiling	D	B	..	..
100%	70°	A	A	A	..
100%	Boiling	C	B	A	..
100%— 150 lbs. Pressure	400°	E	C	..	..
Acetic Anhydride	Boiling	A	A	..	..
	70°	A	A	E	..
Acetic Vapors 100%	Hot	E	C	..	..
30%	Hot	C	B	..	..
Acetone	Boiling	A	A	..	..
	70°	A	A	B	..
Alcohol Ethyl	70°	A	A	A	..
	Boiling	A	A	A	..
Alcohol Methyl	70°	A	A	A	..
	150°	*C	B	C	..
Aluminum Acetate Saturated		A	A	..	..
Aluminum Chloride	70°	D	C	D	..
Alum. (Chrome) 5%	70°	A	A	..	..
Aluminum Fluoride	70°	D	C	D	..
Aluminum Hydroxide Saturated		A	A	A	..
Aluminum	Molten	E	E	E	..
Aluminum Potassium Sulphate 2% (Alum.)	70°	A	A	A	..
10%	70°	A	A	B	..
	Boiling	B	A	C	..
Saturated	Boiling	C	B	D	..

*Subject to pitting at air line or when allowed to dry.

**Keep solutions alkaline.

†May attack when sulphuric acid is present.

††May attack when hydrochloric acid is present.

Substance Condition	Temp. F.	USS 18-8	USS 18-8 Mo	USS 17	USS 12
Aluminum Sulphate					
10%	70°	A	A	D	..
	Boiling	B	A	E	..
Saturated	70°	A	A	D	..
	Boiling	B	A	E	..
Ammonia					
All Concentrations	70°	A	A	A	..
Gas	Hot	D	..	D	..
Ammonia Liquor	70°	A	A	A	..
	Boiling	A	A	..	..
Ammonium					
Bicarbonate	70°	A	A	..	..
	Hot	A	A	..	..
Ammonium Carbonate					
1% & 5% Still	70°	A	A	A	A
Aerated	70°	A	A	A	A
Agitated	70°	A	A	A	A
Ammonium Chloride					
1% Still	70°	A	A	A	A
Aerated	70°	A	A	A	A
Agitated	70°	A	A	A	A
10% Solution	Boiling	*A	*A	A	..
28% Solution	Boiling	*B	*A	..	..
50% Solution	Boiling	*B	*A	..	..
Ammonium Nitrate					
All Con. Agitated / Aerated	70°	A	A	A	A
Saturated	Boiling	A	A	A	A
Ammonium Oxalate 5%	70°	A	A	A	..
Ammonium Persulphate					
5%	70°	A	A	A	..
Ammonium Phosphate					
5%	70°	A	A	A	..
Ammonium Sulphate					
1% & 5% Agitated	70°	A	A	A	B
Aerated	70°	A	A	A	B
10%	Boiling	*B	*A	..	..
Saturated	Boiling	*B	*A	..	..
Ammonium Sulphite	Cold	A	A	..	..
	Boiling	A	A	..	..
Aniline 3%	70°	A	A	A	..
Conc. crude	70°	A	A	A	..
Aniline Hydrochloride	70°	E	D	E	..
Antimony Trichloride	70°	E	D	E	..
Barium Carbonate	70°	A	A	A	..
Barium Chloride 5%	70°	A	A	A	..
Saturated	70°	A	A	A	..
Aqueous Solution	Hot	*B	*A	..	..
Barium Nitrate					
Aqueous Solution	Hot	A	A	..	..
Barium Sulphate					
Barytes-Blanc Fixe	70°	A	A	A	..
Beer		A	A	..	..
Benzene	70°	A	A	A	..
Benzoic Acid	70°	A	A	A	..
Benzol	Hot	A	A	A	..
Blood (Meat Juices)	Cold	*A	A	A	..
Boracic Acid 5%	Hot or Cold	A	A	A	..
Borax 5%	Hot	A	A	A	A
Bromine,					
Bromine Water	70°	E	D	E	..
Buttermilk	70°	A	A	A	B
Butyric Acid 5%	70°	A	A	A	A
5%	150°	A	A	A	..
Aqueous Sol.					
Sp. G. .964	Boiling	A	A	A	..
Calcium Carbonate	70°	A	A	A	..
Calcium Chlorate					
Dilute Solution	70°	A	A	..	..
Dilute Solution	Hot	A	A	..	..

*Subject to pitting at air line or when allowed to dry.

**Keep solutions alkaline.

†May attack when sulphuric acid is present.

‡May attack when hydrochloric acid is present.

Philadelphia
GGent 7450
Park 5351
Baltimore
Arnon 8260

FENCES
INDEX
Technical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelph
REGent 74
Park 535

Baltimore
Vernon 8260

Substance Condition	Temp. F.	USS 18-8	USS 18-8 Mo	USS 17	USS 12
Calcium Chloride					
Dilute	70°	**B	*A	C	..
Conc. Solutions	70°	**B	*A	C	..
Calcium Hydroxide					
10%	Boiling	A	A	..	..
20%	Boiling	A	A	..	..
50%	Boiling	C	B	..	..
Calcium Hypochlorite					
2%	70°	*B	*A	*B	..
Calcium Sulphate					
Saturated	70°	A	A	A	..
Carbolic Acid C. P.	Boiling	A	A	..	..
Crude	Boiling	A	A	..	..
C. P.	70°	A	A	A	.
Carbonated Water		A	A	A	..
Carbon Bisulphide	70°	A	A	A	..
Carbon Monoxide Gas	870°C.	A	A	A	..
	760°C.	A	A	A	A
Carbon Tetrachloride					
Pure	70°	A	A	A	A
Aqueous Solution					
5-10%	70°	*C	..	*C	D
Chloracetic Acid	70°	D	C	E	E
Chlorbenzol Conc. Pure	70°	A	A	A	..
Chloric Acid	70°	E	D	E	..
Chlorinated Water					
Saturated	70°	*C	*B	*D	..
Chlorine Gas—Dry	70°	C	B	C	..
Gas—Moist	70°	D	C	D	..
Gas	100°C.	E	D	E	..
Chloroform	70°	A	A	A	..
Chrome Alum.					
See Alum. (Chrome)					
Chromic Acid					
5%	70°	A	A	B	..
10% C.P.	Boiling	C	B	D	..
50% Com. (cont. SO_3)	Boiling	*D	C	D	..
Chromium Plating					
Bath	70°	A	A	..	..
Cider	70°	A	A	A	..
Citric Acid					
5% Still	70°	A	A	A	A
5% Still	150°	A	A	A	A
15%	70°	A	A	..	..
15%	Boiling	B	A	A	..
Concentrated	Boiling	C	B	..	..
Coca-Cola Syrup (Pure)	70°	A	A	A	..
Coffee	Boiling	A	A	A	..
Copper Acetate					
Saturated Solution	70°	A	A	A	..
Copperas					
See Ferrous Sulphate					
Copper Carbonate					
Sat. Sol. in 50% NH_3OH		A	A	A	..
Copper Chloride					
1% Agitated	70°	*B	*A	*B	*B
1% Aerated	70°	*B	*A	*B	*B
5% Agitated	70°	*C	*B	*B	*B
5% Aerated	70°	*E	*D	*E	*E
Copper Cyanide					
Saturated Solution	Boiling	A	A	A	..
Copper Nitrate					
1% Still	70°	A	A	A	A
1% Agitated	70°	A	A	A	A
1% Aerated	70°	A	A	A	A
5% Still	70°	A	A	A	A
5% Agitated	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
50% Aqueous Solution	Hot	A	A	..	..

*Subject to pitting at air line or when allowed to dry.
**Keep solutions alkaline.
†May attack when sulphuric acid is present.
††May attack when hydrochloric acid is present.

Substance Condition	Temp. F.	USS 18-8	USS 18-8 Mo	USS 17	USS 12
Copper Sulphate					
5% Agitated Still	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
Saturated Solution	Boiling	A	A	..	..
Creosote (Coal Tar)	Hot	A	A	..	..
Creosote Oil	Hot	A	A	..	..
Cyanogen Gas	70°	A	A	..	..
Denitrochlorbenzol					
Melted & Solidified	70°	A	A	A	..
Developing Solutions	70°	A	A	A	..
Dyewood Liquor	70°	†A	A	..	..
Epsom Salt	Hot & Cold	A	A	A	..
Ether	70°	A	A	A	..
Ethyl Chloride	70°	A	A	A	..
Ethylene Chloride	70°	A	A	..	..
Ferric Chloride					
1% Solution Still	70°	††*B	*A	*B	*C
	Boiling	††*D	*C	*D	..
5% Solution Still	70°	††*D	*C	*D	*D
5% Agitated	70°	††*C	*C	*C	*C
5% Aerated	70°	††*C	*C	*D	*D
Ferric Hydroxide (Hydrated Iron Oxide)	70°	A	A	..	..
Ferric Nitrate					
1% Still	70°	A	A	A	A
5% Still	70°	A	A	A	A
1% Agitated	70°	A	A	A	A
5% Agitated	70°	A	A	A	A
1% Aerated	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
Ferric Sulphate					
1 & 5% Still	70°	*A	A	A	A
Aerated or Agitated	70°	*A	A	A	A
Ferrous Sulphate					
Dilute Solution	70°	A	A	A	..
Fluorine	70°	E	E	E	E
Formalin					
40% Sol.					
Formaldehyde		A	A	A	..
Formic Acid					
5% Still	70°	B	A	C	D
5% Still	150°	B	A	C	D
Fruit Juices	70°	A	A	A	A
Fuel Oil	Hot	A	A	..	..
Containing Sulphuric		C	B	..	..
Gallic Acid					
5% Solution	70°	A	A	A	A
	150°	A	A	A	A
Gasoline	70°	A	A	A	A
Glue—Dry	70°	A	A	A	..
Solution—Acid	70°	*B	A	..	..
Solution—Acid	140°	*B	A	..	..
Glycerine	70°	A	A	A	..
Hydrochloric Acid					
All Concentrations	70°	E	E	E	E
Hydrocyanic Acid		A	A	C	..
Hydrofluosilicic Acid	70°	E	D	..	..
Hydrogen Peroxide	70°	†A	A	†A	..
	Boiling	†B	A	†B	..
Hydrogen Sulphide					
Dry		A	A	†A	..
Wet		†B	†A	†C	..
Hyposulphite Soda (Hypo.)		A	A	B	..
Ink		†B	A	..	..
Iodine		E	D	E	..
Iodoform		A	A	..	..
Kerosene	70°	A	A	A	..
Ketchup	70°	*A	A	*A	*A

*Subject to pitting at air line or when allowed to dry.
**Keep solutions alkaline.
†May attack when sulphuric acid is present.
‡May attack when hydrochloric acid is present.

Philadelphia
Gent 7450
ark 5351
Baltimore
rnon 8260

FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelph
REGent 74
Park 535

Baltimore
Vernon 82(

Substance Condition	Temp. F.	USS 18-8	USS 18-8 Mo	USS 17	USS 12
Lactic Acid					
5%	70°	A	A	B	C
5%	150°	B	A	B	D
10%	Boiling	D	B	..	..
10%	150°	C	B	..	..
Lard	70°	A	A	A	..
Lead	Molten	B	B	B	..
Linseed Oil	70°	A	A	A	..
Magnesium Chloride					
1 & 5% Still	70°	*A	A	*A	..
	Hot	*C	*B	..	..
Magnesium Sulphate	Cold & Hot	A	A	A	..
Malic Acid	Cold & Hot	B	A	B	C
Mayonnaise	70°	*A	A	..	..
Mercuric Chloride Dilute Solutions		*E	*D	*E	..
Mercury		A	A	A	..
Methanol (Methyl Alcohol)		A	A	A	..
Milk Fresh or Sour	Hot or Cold	A	A	A	B
Mixed Acids					
53% H_2SO_4	Cold	A	A	A	A
45% HNO_3	Cold	A	A	A	A
Molasses		A	A	A	..
Muriatic Acid	70°	E	E	E	E
Mustard	70°	*A	*A	*C	..
Naphtha	70°	A	A	A	..
Naphtha—Crude	70°	A	A	..	..
Nickel Chloride Solution	70°	*A	*A	..	..
Nickel Sulphate	Hot & Cold	A	A	..	..
Niter Cake	Fused	B	A	B	..
Nitric Acid					
5% Solution	70°	A	A	A	A
20% Solution	70°	A	A	A	A
50% Solution	70°	A	A	A	..
50% Solution	Boiling	A	A	A	..
65% Solution	Boiling	B	B	C	E
Concentrated	70°	A	A	A	A
Concentrated	Boiling	D	D	D	E
Nitrous Acid					
5% Solution	70°	A	A	A	..
Oils, Crude	Hot & Cold	†A	†A	†A	..
Oils, Vegetable, Mineral	Hot & Cold	†A	A	†A	..
Oleic Acid	70°	*A	A	*B	..
Oxalic Acid					
5%	Hot & Cold	A	A	A	B
10%	70°	A	A	..	..
10%	Boiling	D	C	..	..
Paraffine	Hot & Cold	A	A	A	A
Petroleum Ether		A	A	A	A
Phenol		A	A	A	A
Phosphoric Acid					
1%	70°	††A	††A	††A	A
5% Still	70°	A	A	A	A
5% Agitated	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
10% Still	70°	C	A	D	D
10% Agitated	70°	C	B	C	D
10% Aerated	70°	C	B	C	D
Picric Acid	70°	A	A	A	..
Potassium Bichromate	70°	A	A	A	..
Potassium Bromide	70°	*B	*A	..	..
Potassium Carbonate 1% Still, Agitated, Aerated	70°	A	A	A	A
Potassium Carbonate	Hot	A	A	..	..
Potassium Chlorate		A	A	A	..

*Subject to pitting at air line or when allowed to dry.
**Keep solutions alkaline.
†May attack when sulphuric acid is present.
††May attack when hydrochloric acid is present.

Substance Condition	Temp. F.	USS 18-8	USS 18-8 Mo	USS 17	USS 12
Potassium Chloride					
1% Still	70°	*A	*A	*A	*A
Agitated	70°	A	A	A	A
Aerated	70°	A	A	A	A
5% Still	70°	*A	*A	*A	*A
Agitated	70°	A	A	A	A
Aerated	70°	A	A	A	A
	Boiling	A	A	..	..
Potassium Ferricyanide 5%	70°	A	A	A	..
Potassium Ferrocyanide 5%	70°	A	A	A	..
Potassium Hydroxide 5%					
Still, Agitated, Aerated	70°	A	A	A	A
27%	Boiling	A	A	..	..
50%	Boiling	B	A	..	..
Potassium Nitrate 1%					
Still, Agitated, Aerated	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
5% Still & Agitated	70°	A	A	A	A
Potassium Nitrate	Hot	A	A	..	..
Potassium Oxalate		A	A	A	..
Potassium Permanganate 5%	70°	A	A	A	..
Potassium Sulphate					
1% Still	70°	A	A	A	A
1% Agitated	70°	A	A	A	A
1% Aerated	70°	A	A	A	A
5% Still	70°	A	A	A	A
5% Agitated	70°	A	A	A	A
5% Aerated	70°	A	A	A	A
	Hot	A	A	..	..
Potassium Sulphide (Salt)		A	A	..	..
Pyrogallic Acid		A	A	A	..
Quinine Bisulphate Dry		B	A	B	..
Quinine Sulphate Dry		A	A	B	..
Rosin	Molten	A	A	A	..
Sea Water		*A	*A	*C	..
Sewage		†A	†A	..	..
Silver Bromide		*B	*A	*C	..
Silver Chloride		E	E	E	..
Silver Nitrate		A	A	A	..
Soap	70°	A	A	A	..
Sodium Acetate—Moist		*A	A	A	..
Sodium Bicarbonate					
All Concentrations	70°	A	A	A	A
5% Still	150°	A	A	A	A
Sodium Carbonate					
5%	70°	A	A	A	A
5%	150°	A	A	A	A
Sodium Chloride					
5% Still	70°	*A	A	*B	*B
5% Still	150°	*A	A	*B	*B
20% Aerated	70°	*A	A	..	..
Saturated	70°	*A	A	..	..
Saturated	Boiling	*B	A	..	..
Sodium Fluoride 5% Solution		*B	*A	*C	..
Sodium Hydroxide		A	A	A	..
Sodium Hypochlorite 5% Still		*B	*A	C*	..
Sodium Hyposulphite	70°	†A	A	B	..
Sodium Nitrate	Fused	C	B	C	..

*Subject to pitting at air line or when allowed to dry.
**Keep solutions alkaline.
†May attack when sulphuric acid is present.
††May attack when hydrochloric acid is present.

Philadelphia
Gent 7450
Park 5351
Baltimore
Vernon 8260

FENCES
INDEX
Technical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelpl
REGent 74
Park 535

Baltimore
Vernon 82

Substance Condition	Temp. F.	USS 18-8	USS 18-8 Mo	USS 17	USS 12
Sodium Sulphate 5% Still	70°	A	A	A	..
Sodium Sulphate All Concentrations	70°	A	A	C	..
Sodium Sulphide Saturated		*B	A	*B	..
Sodium Sulphite 5%	70°	A	A	C	..
10%	150°	A	A	..	..
Stannic Chloride Spec. Gravity 1.21	Boiling	E	E	..	..
Stannic Chloride Solution	70°	D	C	..	..
Stannous Chloride Saturated		C	A	C	..
Stearic Acid		A	A	A	..
Sugar Juice		A	A	A	..
Sulphur Chloride		E	D	..	..
Sulphur Dioxide Gas—Moist	70°	B	A	C	..
Gas	575°	A	A	A	..
Sulphur—Dry	Molten	A	A	A	..
Wet		*B	*A	*B	..
Sulphuric Acid 5%	70°	C	B	C	..
5%	Boiling	E	C	E	..
10%	70°	C	B	C	..
10%	Boiling	E	D	E	..
50%	70°	D	C	..	..
50%	Boiling	E	D	E	..
Concentrated	70°	A	A	A	..
Concentrated	Boiling	D	D	D	..
Concentrated	300°	E	E	E	..
Fuming	70°	C	B	..	..
Sulphurous Acid Saturated	70°	C	B	C	..
Saturated 60 # Pressure	250°	C	B	C	..
Sulphurous Acid Saturated 70/125 # Pressure	310°	C	B	C	..
150 # Pressure	375°	C	B	C	..
Sulphurous Spray	70°	*D	*D	..	..
Tannic Acid	70°	A	A	A	B
	150°	B	A	B	C
Tartaric Acid	70°	A	A	C	C
	150°	B	A	D	D
Tin	Molten	C	C	C	..
Trichloracetic Acid	70°	E	E	E	..
Varnish	70°	A	A	A	A
	Hot	A	A	..	..
Vegetable Juices		A	A	..	..
Vinegar Fumes		B	A	B	..
Vinegar—Still	70°	A	A	A	A
Agitated		A	A	A	B
Aerated	70°	A	A	A	A
Zinc	Molten	E	E	E	..
Zinc Chloride 5% Still	70°	*A	*A	*A	..
	Boiling	*B	*B	*B	..
Zinc Sulphate 5%	70°	A	A	A	..
Saturated	70°	A	A	A	..
25%	Boiling	A	A	..	..

*Subject to pitting at air line or when allowed to dry.
**Keep solutions alkaline.
†May attack when sulphuric acid is present.
††May attack when hydrochloric acid is present.

FABRICATION DATA FOR USS 18-8 STAINLESS STEEL

FORGING

U S S 18-8 is a strong material; at elevated temperatures its strength is so superior to that of iron and low carbon steel that it forges much more slowly, and less reduction will result from the usual blows under the hammer. It may be forged at temperatures between 2200° and 1800° F., but light blows of the hammer should be used at the start. Heating, which requires a longer time than is allowed for ordinary steels, should be done slowly until a temperature of 1500° to 1600° F. is reached; then more rapidly to full forging temperature. Soaking at the full forging temperature should be avoided. It is advisable to reheat when the work cools down to 1800° to 1750° F., rather than to attempt much deformation of the stiff metal below this temperature.

ANNEALING

Since U S S 18-8 is not hardenable by heat treatment and does not undergo transformations upon cooling, the term "annealing," as here applied, has a somewhat different significance from that usually understood. Annealing U S S 18-8 is accomplished by heating to at least 1850° F. and then cooling rapidly. The treatment produces a completely austenitic structure of minimum grain size which, for numerous applications, is most desirable. Maximum ductility or softening is obtained by heating to about 2050° to 2150° F. and cooling rapidly. For heavy sections the rapid cooling should preferably be obtained by quenching, while in the case of light sections it is sufficient to air cool. The function of the anneal in the case of U S S 18-8 is to remove cold work effects, homogenize the structure and dissolve any carbide particles which may have separated out within the metal at some intermediate temperature. By proper annealing, the metal is restored to the condition in which it has the maximum ductility and softness. It is advisable to cool from the annealing temperature as rapidly as possible, since no harm results from the most drastic quench.

The chromium-nickel stainless steels should not be allowed to remain long at temperatures between about 1000° and 1600° F. as a *final* treatment, nor should the

hiladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260

FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelpl
REGent 74
Park 535

Baltimore
Vernon 82

metal be allowed to cool slowly through this range except when it will subsequently be reheated to a temperature above 1850° F. This requirement eliminates any possibility of annealing 18-8 in the manner commonly followed with the plain carbon steels, which are annealed by heating to a relatively low temperature and cooling slowly. In the case of severely corrosive conditions, 18-8 that has been so treated will have its resistance impaired to a degree dependent upon the length of time it was subjected to the damaging temperature and the nature of the corroding medium. Under such conditions, attack will take place intergranularly; the application of a severely corrosive condition such as pickling sometimes resulting in complete disintegration.

U S S 18-8 is less susceptible to this impairment or deterioration than were the earlier "18 & 8" alloys; nevertheless, for complete realization of the inherent permanence of the alloy, the rule against the 1000° to 1600° F. temperature range should be observed.

Exceptions to this statement are explained in the chapters dealing with the alloys U S S 18-8 S and U S S Stabilized 18-8, and should be referred to in this connection.

WELDING

U S S 18-8 is not air hardening, and consequently yields ductile welds by electric resistance, electric arc, or acetylene torch methods, provided certain precautions are observed. It cannot be hammer welded successfully. Generally, resistance or arc welding will be found the more convenient, except for very thin sections, on account of the greater ease in controlling certain important operating conditions. However, a little practice will enable a competent welder to secure excellent results with this alloy by either gas or electric methods. A welding rod of low carbon U S S 18-8 should be used.

For gas welding: Be sure the surfaces to be welded are clean and free from scale.

Use only sufficient oxygen to insure a non-carburizing atmosphere around the hot metal. Maintain the flame as small as possible, and practically neutral. An oxidizing flame produces unsound welds, while a carburizing flame (one containing an excess of acetylene) produces brittle welds having a low order of corrosion resistance.

Direct the flame toward the unfinished work, thereby preheating.

Weld straight ahead and do not "puddle."

Use an uncoated welding rod of diameter about equal to the thickness of the material being welded, except for thicknesses over ¼-inch, for which ¼-inch rods may be used.

For arc welding: Be sure the surfaces to be welded are clean and free from scale.

The electrode is positive; the work negative. Proper regulation of the current is readily obtained after a familiarity with the welding characteristics of this alloy has been gained. About 35 volts (open circuit) with 60 to 65 amperes is generally satisfactory for a 3/32-inch rod; the current increasing with the rod diameter.

Use a coated rod of diameter about equal to the thickness of the material being welded. The coating should not contain carbon in a form which may be absorbed readily during the welding operation.

It is preferable to lay several medium beads, with intermediate cleaning away of the slag formed, rather than to attempt to weld with a single heavy bead. The cleaning is best accomplished by light hammering with a blunt tool, or with a stiff wire brush.

For resistance welding: The usual spot and seam welding processes may be readily applied to this grade of steel.

Welds of U S S 18-8 have satisfactory physical properties, but since during welding the metal is exposed to intermediate temperatures, the welds (and especially the metal adjacent thereto) may, in general, not possess maximum corrosion resistance. Hence, wherever feasible, the welded article should be annealed as indicated under "Annealing," if it is to withstand the most severe forms of corrosive attack.

The U S S 18-8 S and U S S Stabilized 18-8 alloys are the exceptions here also, as mentioned previously under "Annealing," and the chapters dealing with these alloys should be consulted.

FORMING AND DEEP DRAWING

U S S 18-8, while a more ductile metal than ordinary steel, is at the same time a stronger material, work hardens more rapidly, and accordingly requires more power in forming operations. In general, slower speeds are advisable, especially in the case of equipment originally designed for the softer materials. Solid steel dies are preferable; the deep hardening, non-deforming types of alloy

Castings
Stock Lists →
Sheets Plates
Bars Angles
Pipe and Tubes
Fittings Valves
Bolts, Nuts, etc. Welding Rods
hiladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelph
REGent 74
Park 535

Baltimore
Vernon 82

tool steels being well adapted as die steels for forming U S S 18-8. Extremely well polished dies are the most satisfactory. A clearance about twice that used for ordinary steel or brass is usually considered good practice. Dies should be designed with the allowance for spring-back two or three times that for ordinary steel.

Forming and drawing operations on U S S 18-8 demand effective lubricants. From several standpoints, the so-called water-soluble drawing compounds are quite satisfactory. Linseed oil mixed with whiting and sulphur, as well as lithopone, are effective lubricants in some operations. The lubricant should be removed from the stamped articles after forming is completed.

Forming operations are best applied to annealed U S S 18-8. Severe draws are possible without intermediate annealing, but whenever annealing becomes necessary the lubricant must first be removed, hence the necessity of considering this factor in the choice of lubricant. If not cleansed the metal will become contaminated (particularly carburized) by the decomposing lubricant, and its final properties and surface appearance may be impaired.

After annealing, which should consist of heating to 1850° F. or above, and quenching in water (or air cooling in thin sections), the metal should be pickled before continuing with the forming operations. This cycle may be repeated as often as necessary.

The adaptation of U S S 18-8 for cold forming operations is materially facilitated by a pre-warming of the blanks or dies, or both, to a very moderate temperature, such as 300° to 500° F., or any temperature which will not act to soften the dies by tempering. Working in this manner is accompanied by less hardening during deep drawing operations and may suffice to eliminate an annealing operation. This procedure is covered by a process patent assigned to the United States Steel Corporation.

RIVETING

U S S 18-8 lends itself readily to either hot or cold riveting. Small rivets, up to about ⅜-inch, may be driven cold, and are set most advantageously by a comparatively few heavy blows. Hot rivets should be heated out of contact with flame to a temperature of 2100° F., and be set rapidly so that mechanical deformation is finished before they cool below 1800° F.

SPINNING

Owing to the high ductility of U S S 18-8, it is well adapted to spinning operations. Being a strong metal and one which grows stiffer with cold work, it will require more power than is needed for brass. The spinning tool should have a fairly large radius, and the operation should be conducted at definitely slower speed than is customary with softer materials. When the total deformation exceeds that which can be accomplished in one operation, the work should be annealed, as outlined previously, and pickled. This involves removing the lubricant, and accordingly the water-soluble lubricants are most convenient. The thin sections employed in spinning can be heated very quickly and need be held in a muffle furnace for only about 5 minutes, followed by a quick cooling in the air or a water quench.

PICKLING

A hot pickling solution is required for U S S 18-8. The temperature should be approximately 150° F. Either hydrochloric (muriatic) acid or its equivalent (sulphuric acid and common coarse salt) is used. Sulphuric acid alone may be too slow in action to be practical.

It is customary to employ a solution made by mixing equal volumes of commercial hydrochloric acid and water.

Where sulphuric acid and rock salt are used, 10% sulphuric acid and 10% salt, heated to approximately 180° F., is satisfactory.

Nitro-hydrofluoric acid may also be used; a mixture of 10% nitric acid and 1 to 1½% hydrofluoric acid, used at 125° to 130° F., will be found satisfactory.

A bright finish is secured by adding a small amount of nitric acid to the hydrochloric acid pickling solutions. The usual bright pickle solution consists of 4 volumes concentrated hydrochloric acid, 4 volumes water, and ½ to 1 volume concentrated nitric acid. Heavily scaled articles should be pickled in a solution consisting of 8 volumes concentrated hydrochloric acid, 7 volumes concentrated sulphuric acid, and 15 volumes water, prior to using the bright pickle solution.

It is advisable to add a suitable inhibitor to the solutions used for pickling stainless steels. A number of satisfactory inhibitors are readily available commercially.

After all pickling operations the pickling acid should be rinsed off in hot water and the work than be given a

Philadelp
REGent 7
Park 535

Baltimor
Vernon 8

few minutes in hot 10% to 20% nitric acid (about 125° to 140° F.), followed by a wash in hot water.

The ideal tank for the nitric acid dip solution is one made of U S S 18-8, or one lined with this metal.

PASSIVATION OF FINISHED ARTICLES

During machining, riveting, forming, polishing, etc., foreign particles may become embedded in the surface of the stainless steel, and unless there are removed they will subsequently lead to rust spots. To avoid this potential source of trouble, the finished article should be swabbed or immersed for a few minutes in hot 10% to 20% nitric acid (about 125° to 140° F.), followed by a wash in hot water, as mentioned under "Pickling." This treatment insures the restoration of the protective surface film, upon which rustlessness depends.

OPERATIONS INVOLVING CUTTING

A. *Sawing*—U S S 18-8 is not cut with the same ease as ordinary annealed steel, nevertheless it is satisfactorily cut by the saw. A high speed steel saw, rather heavily weighted, should be used and so applied that the first stroke definitely cuts the metal. If the work heats it will cut somewhat better. A wavy set saw is particularly well chosen for this metal. It is disadvantageous to permit the saw to ride over the work without cutting, as this quickly work hardens the U S S 18-8 locally, and renders the operation much more difficult.

B. *Machining*—The art of cutting U S S 18-8 may be summed up by the recommendations—(1) slow speed, (2) heavy cut, (3) sharpest tools, (4) generous rake. If the work warms up considerably, the cutting is easier. It may be machined dry or with lard oil-sulphur lubricant.

C. *Drilling*—Drilling involves the same considerations as machining. Use a very sharp drill—preferably of high speed steel. Make the drill cut all the time, but remove and cool occasionally. The work should be backed up so that the drill cuts through without punching out the last metal. If a lubricant is required, the lard oil-sulphur mixture is effective.

D. *Threading*—The same general rules apply as for other machining operations. A four- or five-thread lead is advisable.

PUNCHING AND SHEARING

As a further adjustment to the very great toughness and elongation of U S S 18-8, the engaging parts employed for shearing and punching must fit more neatly than those used for ordinary steel; otherwise, metal may drag between the punch and the die. In punch work it is necessary to punch all the way through the stock, in order to obtain clean edges and clean parting of the metal. Shear blades must press together closely.

SOLDERING

Notwithstanding the protective character of the surface of U S S 18-8, it may be soldered, provided a sufficiently strong agent be used to develop a clean metal surface. The hydrochloric acid-zinc chloride combinations (muriatic acid cut with zinc) are effective. Polished surfaces are more resistant to etching by the soldering fluid and, therefore, some little time should be allowed. Care should be taken to prevent the contact of flux with metal away from the seam, and any excess should be removed by thoroughly scrubbing and washing the finished articles, using a mild alkali solution.

Because of the ease of welding U S S 18-8, and the possibility of deleterious effect on the metal, it is, in general, inadvisable to braze, although brazing is easily accomplished.

POLISHING

The methods of polishing U S S 18-8 vary so greatly with the nature of the articles that it is impossible here to give any detailed instructions. Therefore, only a few general suggestions are offered.

The most suitable abrasives are those of the silicon carbide or aluminum oxide type. They should be used on a soft grease wheel. Stearic-base grease is preferable to the petroleum-base grease on account of its higher softening point. In general, dry grinding should never be used and, for obvious reasons, iron oxide polishing compounds should not be applied to the stainless steels.

Grinding speeds should not exceed 8,000 feet per minute, although final buffing speeds may reach 10,000 feet per minute without damage. Higher grinding speed roughens the surface in a characteristic manner. In general, after the last grinding, it is advisable to brush before buffing.

See Next Page
Castings
Stock Lists
Sheets Plates
Bars Angles
Pipe and Tubes
Fittings Valves
Bolts, Nuts, etc. Welding Rods

hiladelphia
Gent 7450
'ark 5351
Baltimore
rnon 8260

FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

STAINLESS AND HEAT RESISTING ALLOY CASTINGS

We are the Distributors for:

NATIONAL ALLOY STEEL

one of the largest and oldest manufacturers, exclusively of cast alloy steels containing chromium and nickel. Metallurgists and engineers specially trained to assist in the choice of material and design of equipment are available at all times. Many years of actual experience in the field with the problems caused by high temperatures and corrosion will assist these men to approach your problems on a basis of complete cooperation.

The NATIONAL ALLOY STEEL has made every effort to keep its equipment and foundry practice up to date and delivery arranged to comply with your requirements. This service is available in alloys cast in sand and cast centrifugally, to the most rigid specifications. Special consideration is given to carbon content and extra alloy additions where the conditions warrant.

For your information we can furnish castings in all of the standard grades as specified. It is important to note that the service obtained from these alloys depends entirely upon your operating conditions, and we therefore request that you supply us with as complete information as possible in order that the maximum service be obtained from the material. For example, if the material is to be used at high temperatures, maximum and minimum working temperatures, kind of fuel used and resulting atmospheres, and loading are important in determining the proper design and analysis to get the maximum results. If the problem be corrosion, the importance of carbon content alone warrants careful checking of conditions.

We are listing below some of the more than 40 Stainless and Heat Resisting Alloy Steels regularly poured in the cast form by our principals:

Grade	Cr Content	Ni Content
NA-1	26-30%	7- 9%
NA-2	13-17%	34-37%
NA-4	17-23%	7- 9%
NA-4M	17-22%	7- 9% approx. 3.5% Moly.
NA-6	23-28%	10-13%
NA-19	25-30%	3% Max.
NA-65	15-19%	65-68%

Please note that the carbon content of the alloys may be varied to give the best results in service.

INDEX
OF
STAINLESS AND HEAT RESISTING STEELS
Stock Lists
FOR IMMEDIATE SHIPMENT
From Warehouse

SHEETS — Pages

USS 18-8—Type 302—P.O.S. No. 4 Fin. 236-238
USS 18-8—Type 302—No. 2-B Fin. 239-240
USS 17—Type 430—P.O.S. No. 4 Fin. 241

PLATES

USS 18-8—Type 302—P.O.S. No. 4 Fin. 238

BARS

USS 18-8 FM—Type 303—Rounds 242-243
USS 18-8—Type 302—Squares 244
USS 18-8 FM—Type 303—Hexagons 244
USS 18-8—Type 302—Flats 245
USS 12-Z—Type 416—Rounds 246
USS 12-Z—Type 416—Hexagons 246

ANGLES

USS 18-8—Type 302 245

PIPE AND TUBES

B & W CROLOY 18-8 S—Type 304—Seamless Pipe 247
Carpenter No. 4 (18-8 S)—Type 304—Welded Pipe 248
Carpenter No. 4 (18-8 S)—Type 304—Welded Tubing 249
18-8 S MO—Type 316—Welded Pipe 248
18-8 S MO—Type 316—Welded Tubing 249

PIPE FITTINGS

Cooper Alloy—18-8 S—Screwed 250
Companion Flanges—18-8 S 251
Pipe Nipples 18-8 S 251

VALVES

Pratt & Cady 18-8 252
Pratt & Cady 12/14 Cr. 252
Jenkins Bros. 252

SPECIALTIES

Machine Screws, Round Head—18-8 253
Machine Screws, Flat Head—18-8 253-254
Machine Screws, Oval Head—18-8 254
Rivets, Tinners—18-8 254
Rivets, Round Head—18-8 255
Rivets, Countersunk Head—18-8 255
Rivets, Flat Head—18-8 255
Machine Bolts, Hex. Head—18-8 256
Cap Screws, Hex. Head—18-8 256
Lock Washers—18-8 256
Flat Washers—18-8 256
Cotter Pins—18-8 256
Nuts, U. S. Standard—18-8 257
Nuts, Machine Screw—18-8 257
Nuts, Wing—18-8 257
Nails, Wire—18-8 257
Wood Screws, Round Head—18-8 258
Wood Screws, Flat Head—18-8 258
Wood Screws, Oval Head—18-8 258
Sheet Metal Screws—18-8 258
Wire Rope—18-8 258

WELDING RODS

POTTSCO 19-9 S—Type 306—Electrodes 259
POTTSCO 19-9 S—Type 306—Gas Welding Rods 259

CASTINGS

National Alloy Steel Co. 234

iladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260

USS 18-8 STAINLESS STEEL SHEETS

TYPE 302

No. 4 FINISH, POLISHED ONE SIDE

Annealed and Standard Polish

Sizes From Stock Without Waste

U. S. Std. Gauge	Size Inches Width x Length	Estimated Weight Per Sheet Pounds	Weight Per Square Foot Pounds
26 (.0187″)	15 x 48	4.0	.7875
	15 x 96	7.9	.7875
	18 x 48	4.7	.7875
	18 x 60	5.8	.7875
	18 x 96	9.4	.7875
	18 x 120	11.7	.7875
	*24 x 96	12.6	.7875
	30 x 48	7.9	.7875
	*30 x 96	15.8	.7875
	36 x 48	9.4	.7875
	36 x 60	11.7	.7875
	*36 x 96	18.8	.7875
	*36 x 120	23.5	.7875
24 (.025″)	15 x 48	5.3	1.050
	15 x 96	10.5	1.050
	18 x 48	6.3	1.050
	18 x 60	7.9	1.050
	18 x 96	12.6	1.050
	18 x 120	15.8	1.050
	*24 x 96	16.8	1.050
	30 x 48	10.5	1.050
	*30 x 96	21.0	1.050
	36 x 48	12.6	1.050
	36 x 60	15.8	1.050
	*36 x 96	25.2	1.050
	*36 x 120	31.5	1.050
22 (.0312″)	15 x 48	6.5	1.312
	15 x 96	13.1	1.312
	18 x 48	7.8	1.312
	18 x 60	9.8	1.312
	18 x 96	15.7	1.312
	18 x 120	19.7	1.312
	24 x 48	10.5	1.312
	24 x 60	13.2	1.312
	*24 x 96	21.0	1.312
	24 x 120	26.3	1.312
	30 x 48	13.1	1.312
	*30 x 96	26.2	1.312
	36 x 48	15.7	1.312
	36 x 60	19.7	1.312
	*36 x 96	31.4	1.312
	*36 x 120	39.3	1.312
	48 x 48	21.0	1.312
	48 x 60	26.3	1.312
	*48 x 96	42.0	1.312
	*48 x 120	52.5	1.312

*Full sized sheets. Other sizes shown we cut without charge for waste but with nominal cutting extra.

USS Stainless and Heat Resisting Sheets can be furnished in other analyses and sizes, and in any quantity.

USS 18-8 STAINLESS STEEL SHEETS

TYPE 302

No. 4 FINISH, POLISHED ONE SIDE

Annealed and Standard Polish
Sizes From Stock Without Waste

U. S. Std. Gauge	Size Inches Width x Length	Estimated Weight Per Sheet Pounds	Weight Per Square Foot Pounds
20 (.0375″)	15 x 48	7.9	1.575
	15 x 96	15.8	1.575
	18 x 48	9.5	1.575
	18 x 60	11.8	1.575
	18 x 96	18.9	1.575
	18 x 120	23.7	1.575
	24 x 60	15.8	1.575
	24 x 120	31.5	1.575
	30 x 48	15.8	1.575
	*30 x 96	31.5	1.575
	36 x 48	18.9	1.575
	36 x 60	23.7	1.575
	*36 x 96	37.8	1.575
	*36 x 120	47.3	1.575
	48 x 60	31.5	1.575
	*48 x 120	63.0	1.575
18 (.050″)	15 x 48	10.5	2.100
	15 x 96	21.0	2.100
	18 x 48	12.6	2.100
	18 x 60	15.8	2.100
	18 x 96	25.2	2.100
	18 x 120	31.5	2.100
	24 x 48	16.8	2.100
	24 x 60	21.0	2.100
	24 x 96	33.6	2.100
	24 x 120	42.0	2.100
	30 x 48	21.0	2.100
	*30 x 96	42.0	2.100
	36 x 48	25.2	2.100
	36 x 60	31.5	2.100
	*36 x 96	50.4	2.100
	*36 x 120	63.0	2.100
	48 x 48	33.6	2.100
	48 x 60	42.0	2.100
	*48 x 96	67.2	2.100
	*48 x 120	84.0	2.100
16 (.0625″)	18 x 48	15.8	2.625
	18 x 60	19.7	2.625
	18 x 96	31.5	2.625
	18 x 120	39.4	2.625
	24 x 48	21.0	2.625
	24 x 60	26.3	2.625
	24 x 96	42.0	2.625
	24 x 120	52.5	2.625
	36 x 48	31.5	2.625
	36 x 60	39.4	2.625
	*36 x 96	63.0	2.625
	*36 x 120	78.8	2.625
	48 x 48	42.0	2.625
	48 x 60	52.5	2.625
	*48 x 96	84.0	2.625
	*48 x 120	105.0	2.625

*Full sized sheets. Other sizes shown we cut without charge for waste but with nominal cutting extra.

USS Stainless and Heat Resisting Sheets can be furnished in other analyses and sizes, and in any quantity.

USS 18-8 STAINLESS STEEL SHEETS
TYPE 302
No. 4 FINISH, POLISHED ONE SIDE
Annealed and Standard Polish
Sizes From Stock Without Waste

U. S. Std. Gauge	Size Inches Width x Length	Estimated Weight Per Sheet Pounds	Weight Per Square Foot Pounds
14 (.0781″)	18 x 48	19.7	3.281
	18 x 60	24.6	3.281
	18 x 96	39.4	3.281
	18 x 120	49.2	3.281
	24 x 60	32.8	3.281
	24 x 120	65.6	3.281
	36 x 48	39.4	3.281
	36 x 60	49.2	3.281
	*36 x 96	78.7	3.281
	*36 x 120	98.4	3.281
	48 x 60	65.6	3.281
	*48 x 120	131.2	3.281
12 (.1093″)	18 x 48	27.5	4.594
	18 x 96	55.1	4.594
	24 x 60	45.9	4.594
	24 x 120	91.8	4.594
	36 x 48	55.1	4.594
	*36 x 96	110.2	4.594
	48 x 60	91.8	4.594
	*48 x 120	183.6	4.594
11 (.125″)	24 x 60	52.5	5.250
	24 x 120	105.0	5.250
	48 x 60	105.0	5.250
	*48 x 120	210.0	5.250

*Full sized sheets. Other sizes shown we cut without charge for waste but with nominal cutting extra.

USS Stainless and Heat Resisting Sheets can be furnished in other analyses and sizes, and in any quantity.

USS 18-8 STAINLESS STEEL PLATE
TYPE 302
No. 4 FINISH, POLISHED ONE SIDE
Annealed and Standard Polish
Sizes From Stock Without Waste

Thickness Inches	Size Inches Width x Length	Estimated Weight Per Sheet Pounds	Weight Per Square Foot Pounds
3/16″ (.1875″)	24 x 60	78	7.752
	24 x 120	155	7.752
	48 x 60	155	7.752
	*48 x 120	310	7.752

*Full sized sheets. Other sizes shown we cut without charge for waste but with nominal cutting extra.

1/4″ Plates and heavier USS Stainless Steel may be had promptly in stock sizes, cut to exact size or furnished in circles, suitable for tank fabrication. They may be had in any of the standard analyses.

Use POTTSCO Stainless Steel Welding Rods

USS 18-8 STAINLESS STEEL SHEETS

TYPE 302

No. 2-B FINISH

Full Finish (Bright Cold Rolled)
Sizes From Stock Without Waste

U. S. Std. Gauge	Size Inches Width x Length	Estimated Weight Per Sheet Pounds	Weight Per Square Foot Pounds
26 (.0187″)	15 x 48	4.0	.7875
	15 x 96	7.9	.7875
	18 x 48	4.7	.7875
	18 x 60	5.8	.7875
	18 x 96	9.4	.7875
	18 x 120	11.7	.7875
	30 x 48	7.9	.7875
	*30 x 96	15.8	.7875
	36 x 48	9.4	.7875
	36 x 60	11.7	.7875
	*36 x 96	18.8	.7875
	*36 x 120	23.5	.7875
24 (.025″)	15 x 48	5.3	1.050
	15 x 96	10.5	1.050
	18 x 48	6.3	1.050
	18 x 60	7.9	1.050
	18 x 96	12.6	1.050
	18 x 120	15.8	1.050
	24 x 60	10.5	1.050
	24 x 120	21.0	1.050
	30 x 48	10.5	1.050
	*30 x 96	21.0	1.050
	36 x 48	12.6	1.050
	36 x 60	15.8	1.050
	*36 x 96	25.2	1.050
	*36 x 120	31.5	1.050
	48 x 60	21.0	1.050
	*48 x 120	42.0	1.050
22 (.0312″)	15 x 48	6.5	1.312
	15 x 96	13.1	1.312
	18 x 48	7.8	1.312
	18 x 60	9.8	1.312
	18 x 96	15.7	1.312
	18 x 120	19.7	1.312
	24 x 60	13.2	1.312
	*24 x 120	26.3	1.312
	30 x 48	13.1	1.312
	*30 x 96	26.2	1.312
	36 x 48	15.7	1.312
	36 x 60	19.7	1.312
	*36 x 96	31.4	1.312
	*36 x 120	39.3	1.312
	48 x 60	26.3	1.312
	*48 x 120	52.5	1.312
20 (.0375″)	15 x 48	7.9	1.575
	15 x 96	15.8	1.575
	18 x 48	9.5	1.575
	18 x 60	11.8	1.575
	18 x 96	18.9	1.575
	18 x 120	23.7	1.575
	24 x 60	15.8	1.575
	24 x 120	31.5	1.575
	30 x 48	15.8	1.575
	30 x 96	31.5	1.575
	36 x 48	18.9	1.575
	36 x 60	23.7	1.575
	*36 x 96	37.8	1.575
	*36 x 120	47.3	1.575

*See page 240.

iladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260

USS 18-8 STAINLESS STEEL SHEETS

TYPE 302

No. 2-B FINISH

Full Finish (Bright Cold Rolled)
Sizes From Stock Without Waste

U. S. Std. Gauge	Size Inches Width x Length	Estimated Weight Per Sheet Pounds	Weight Per Square Foot Pounds
20	48 x 60	31.5	1.575
(.0375″)	*48 x 120	63.0	1.575
18	15 x 48	10.5	2.100
(.050″)	15 x 96	21.0	2.100
	18 x 48	12.6	2.100
	18 x 60	15.8	2.100
	18 x 96	25.2	2.100
	18 x 120	31.5	2.100
	24 x 60	21.0	2.100
	24 x 120	42.0	2.100
	30 x 48	21.0	2.100
	*30 x 96	42.0	2.100
	36 x 48	25.2	2.100
	36 x 60	31.5	2.100
	*36 x 96	50.4	2.100
	*36 x 120	63.0	2.100
	48 x 60	42.0	2.100
	*48 x 120	84.0	2.100
16	18 x 48	15.8	2.625
(.0625″)	18 x 60	19.7	2.625
	18 x 96	31.5	2.625
	18 x 120	39.4	2.625
	24 x 60	26.3	2.625
	24 x 120	52.5	2.625
	36 x 48	31.5	2.625
	36 x 60	39.4	2.625
	*36 x 96	63.0	2.625
	*36 x 120	78.8	2.625
	48 x 60	52.5	2.625
	*48 x 120	105.0	2.625
14	18 x 48	19.7	3.281
(.0781″)	18 x 96	39.4	3.281
	24 x 60	32.8	3.281
	24 x 120	65.6	3.281
	36 x 48	39.4	3.281
	*36 x 96	78.7	3.281
	48 x 60	65.6	3.281
	*48 x 120	131.2	3.281
11	18 x 48	31.5	5.250
(.125″)	18 x 96	63.0	5.250
	24 x 60	52.5	5.250
	24 x 120	105.0	5.250
	36 x 48	63.0	5.250
	*36 x 96	126.0	5.250
	48 x 60	105.0	5.250
	*48 x 120	210.0	5.250

*Full sized sheets. Other sizes shown we cut without charge for waste but with nominal cutting extra.

USS Stainless and Heat Resisting Sheets can be furnished in other analyses and sizes, and in any quantity.

2-B Finish sheets have many uses where high polish is not required. However, they are easily buffed to produce a soft or bright polish. They are easily welded, soldered, punched, formed, sheared or spun and resist many corrosive actions.

USS 17 STAINLESS STEEL SHEETS
TYPE 430
No. 4 FINISH, POLISHED ONE SIDE

Annealed and Standard Polish
Sizes From Stock Without Waste

U. S. Std. Gauge	Size Inches Width x Length	Estimated Weight Per Sheet Pounds	Weight Per Square Foot Pounds
26 (.0187″)	18 x 48	4.7	.773
	18 x 96	9.3	.773
	36 x 48	9.3	.773
	*36 x 96	18.5	.773
24 (.025″)	18 x 48	6.2	1.030
	18 x 96	12.4	1.030
	36 x 48	12.4	1.030
	*36 x 96	24.7	1.030
22 (.0312″)	18 x 48	7.8	1.288
	18 x 96	15.5	1.288
	36 x 48	15.5	1.288
	*36 x 96	30.9	1.288
20 (.0375″)	18 x 48	9.3	1.545
	18 x 96	18.5	1.545
	36 x 48	18.5	1.545
	*36 x 96	37.0	1.545

*Full sized sheets. Other sizes shown we cut without charge for waste but with nominal cutting extra.

STANDARD THICKNESS TOLERANCES FOR USS STAINLESS STEEL SHEETS

(Applies only to No. 1, No. 2-D and No. 2-B Fin.)

Ordered Thickness Inch	Tolerance Plus or Minus Inch	Ordered Thickness Inch	Tolerance Plus or Minus Inch
0.005	0.001	0.073 to 0.083	0.007
0.006 to 0.007	0.0015	0.084 to 0.098	0.008
0.008 to 0.0160	0.002	0.099 to 0.114	0.009
0.0161 to 0.026	0.003	0.115 to 0.130	0.010
0.027 to 0.040	0.004	0.131 to 0.145	0.012
0.041 to 0.058	0.005	0.146 to 0.176	0.014
0.059 to 0.072	0.006		

STANDARD WEIGHT TOLERANCES

The actual weight of any one item of an ordered thickness and size in any finish is limited in overweight by the following tolerances:

1. Any item of five sheets or less, or any item estimated to weigh 200 pounds or less, may actually weigh as much as 10% over the estimated weight.

2. Any item of more than five sheets and estimated to weigh more than 200 pounds may actually weigh as much as 7½% over the estimated weight.

There is no under-tolerance in weight for No. 1 and No. 2 finishes, these finishes being limited in under-tolerance only by the permissible thickness variations. Polished sheets may actually weigh as much as 5% less than the estimated weight.

For determining estimated weight the following weights per sq. ft., per inch thickness are to be used.

Chromium Nickel Stainless Steel Sheets.....42.0 pounds
Straight Chromium Stainless Steel Sheets.....41.2 pounds

hiladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260
Bars Angles
Pipe and Tubes
Fittings Valves
Bolts, Nuts, etc. Welding Rods
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

USS 18-8 FM STAINLESS STEEL BARS

TYPE 303

Free Machining Grade — Ground Finish

ROUNDS

Size Inches	Estimated Weight Per Foot	Approx. Weight Per Bar	Approx. Feet in 100 lbs.	Stock Lengths Feet
1/8	.042	0.52	2326.7	10–12
3/16	.094	1.13	1063.8	10–12
1/4	.167	2.00	600.0	10–12
5/16	.261	3.13	383.0	10–12
3/8	.376	4.51	265.9	10–12
7/16	.511	6.13	195.6	10–12
1/2	.668	8.02	149.7	10–12
	.668	14.69	149.7	20–22
9/16	.845	10.14	118.3	10–12
	.845	18.59	118.3	20–22
5/8	1.043	12.52	95.9	10–12
	1.043	22.95	95.9	20–22
11/16	1.262	15.14	79.2	10–12
	1.262	27.76	79.2	20–22
3/4	1.502	18.02	66.6	10–12
	1.502	33.04	66.6	20–22
13/16	1.763	21.16	56.7	10–12
	1.763	38.79	56.7	20–22
7/8	2.044	24.53	48.9	10–12
	2.044	44.97	48.9	20–22
15/16	2.347	28.20	42.6	10–12
	2.347	51.63	42.6	20–22
1	2.670	32.04	37.5	10–12
	2.670	58.74	37.5	20–22
1 1/16	3.014	36.20	33.2	10–12
	3.014	66.31	33.2	20–22
1 1/8	3.379	40.55	29.6	10–12
	3.379	74.34	29.6	20–22
1 3/16	3.766	45.20	26.6	10–12
	3.766	82.90	26.6	20–22
1 1/4	4.173	50.07	24.0	10–12
	4.173	91.81	24.0	20–22
1 5/16	4.600	55.20	21.7	10–12
	4.600	101.20	21.7	20–22
1 3/8	5.049	60.60	19.8	10–12
	5.049	111.10	19.8	20–22

Stainless and Heat Resisting Castings: Page 234

USS 18-8 FM STAINLESS STEEL BARS

TYPE 303

Free Machining Grade — Ground Finish

ROUNDS

Size Inches	Approx. Weight Per Foot	Approx. Weight Per Bar	Approx. Feet in 100 Pounds	Stock Lengths Feet
1 7/16	5.518	66.22	18.1	10–12
	5.518	121.40	18.1	20–22
1 1/2	6.008	72.10	16.6	10–12
	6.008	132.20	16.6	20–22
1 9/16	6.520	78.24	15.3	10–12
	6.520	143.44	15.3	20–22
1 5/8	7.051	84.61	14.2	10–12
	7.051	155.12	14.2	20–22
1 11/16	7.604	91.25	13.1	10–12
	7.604	167.30	13.1	20–22
1 3/4	8.178	98.14	12.2	10–12
	8.178	179.92	12.2	20–22
1 13/16	8.773	105.30	11.4	10–12
	8.773	193.00	11.4	20–22
1 7/8	9.388	112.66	10.6	10–12
	9.388	206.54	10.6	20–22
1 15/16	10.024	120.30	10.0	10–12
	10.024	220.53	10.0	20–22
2	10.681	128.20	9.3	10–12
	10.681	235.00	9.3	20–22
2 1/4	13.519	162.23	7.4	10–12
	13.519	297.42	7.4	20–22
2 1/2	16.690	200.30	6.0	10–12
	16.690	367.20	6.0	20–22
2 3/4	20.195	242.34	4.9	10–12
	20.195	444.39	4.9	20–22
3	24.033	288.40	4.1	10–12
	24.033	528.73	4.1	20–22
3 1/4	28.206	338.50	3.5	10–12
	28.206	620.53	3.5	20–22
3 1/2	32.712	392.54	3.0	10–12
	32.712	719.66	3.0	20–22
4	42.726	512.71	2.3	10–12
	42.726	940.00	2.3	20–22

Our Corrosion and Heat Resisting Engineering Service is at your disposal at all times to insure the proper use of the proper grade for your application.

hiladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260
Bars Angles
Pipe and Tubes
Fittings Valves
Bolts, Nuts, etc. Welding Rods
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelp
REGent 7
Park 535

Baltimor
Vernon 82

USS 18-8 STAINLESS STEEL BARS

TYPE 302

Hot Rolled, Annealed and Pickled

SQUARES

Size Inches	Estimated Weight Per Foot Pounds	Approx. Weight Per Bar Pounds	Approx. Feet in 100 Pounds	Stock Lengths Feet
*1/8	.053	.74	1886.0	12–14
*3/16	.120	1.68	833.0	12–14
1/4	.212	2.97	472.0	12–14
5/16	.332	4.65	301.0	12–14
3/8	.478	6.69	209.0	12–14
7/16	.651	9.12	154.0	12–14
1/2	.850	11.90	117.0	12–14
5/8	1.328	18.59	75.0	12–14
3/4	1.913	26.78	52.0	12–14
7/8	2.603	36.44	38.0	12–14
1	3.400	47.60	29.5	12–14
1 1/4	5.312	74.37	18.8	12–14
1 1/2	7.650	107.00	13.1	12–14

*These sizes are Cold Drawn.

USS 18-8 FM STAINLESS STEEL BARS

TYPE 303

Free Machining Grade — Cold Draw

HEXAGONS

Size Inches	Estimated Weight Per Foot Pounds	Approx. Weight Per Bar Pounds	Approx. Feet in 100 Pounds	Stock Lengths Feet
1/4	.184	2.57	543.0	12–14
5/16	.287	4.02	349.0	12–14
3/8	.414	5.80	242.0	12–14
7/16	.563	7.88	178.0	12–14
1/2	.736	10.30	136.0	12–14
9/16	.931	13.03	107.0	12–14
5/8	1.150	16.10	87.0	12–14
11/16	1.391	19.47	72.0	12–14
3/4	1.656	23.18	60.0	12–14
13/16	1.943	27.20	52.0	12–14
7/8	2.254	31.56	45.0	12–14
15/16	2.587	36.22	38.7	12–14
1	2.945	41.23	34.0	12–14
1 1/16	3.324	46.54	30.1	12–14
1 1/8	3.730	52.22	27.0	12–14
1 1/4	4.600	64.40	22.0	12–14
1 1/2	6.630	92.82	15.1	12–14

18-8 STAINLESS STEEL HEXAGON NUTS

U. S. Standard Thread

Bolt Size Inches	Across Flats Inches	Thickness Inches	Number Threads Per Inch
3/16	3/8	3/16	..
1/4	1/2	1/4	20
5/16	19/32	5/16	18
3/8	11/16	3/8	16
1/2	7/8	1/2	13
5/8	1 1/16	5/8	11
3/4	1 1/4	3/4	10
1	1 5/8	1	8

USS 18-8 STAINLESS STEEL BARS

TYPE 302

Hot Rolled, Annealed and Pickled

FLATS

Size Inches	Estimated Weight Per Foot Pounds	Approx. Feet in 100 Pounds	Stock Lengths Feet
1/16 x 1 1/4	.266	375.9	Coils
1/8 x 1/2	.212	472.0	12–14
x 3/4	.318	315.0	12–14
x 1	.425	235.0	12–14
x 1 1/8	.478	209.2	Cut Coils
x 1 3/8	.585	171.9	Cut Coils
x 1 1/2	.637	157.0	12–14
x 1 5/8	.692	144.5	Cut Coils
x 2	.850	118.0	12–14
x 2 3/4	1.170	85.5	Cut Coils
x 3 1/4	1.380	72.5	Cut Coils
x 3 1/2	1.490	67.1	Cut Coils
x 4 1/2	1.910	52.3	Cut Coils
3/16 x 1/2	.318	315.0	12–14
x 3/4	.478	209.0	12–14
x 1	.637	157.0	12–14
x 1 1/2	.956	105.0	12–14
x 2	1.275	78.0	12–14
1/4 x 1/2	.425	235.0	12–14
x 3/4	.637	157.0	12–14
x 1	.850	118.0	12–14
x 1 1/2	1.275	78.0	12–14
x 2	1.700	59.0	12–14
x 3	2.550	39.0	12–14
3/8 x 1	1.275	78.0	12–14
x 1 1/2	1.913	53.0	12–14
x 2	2.550	39.0	12–14
x 3	3.825	26.0	12–14
1/2 x 1	1.700	59.0	12–14
x 1 1/2	2.550	39.0	12–14
x 2	3.400	29.0	12–14
x 3	5.100	19.0	12–14
x 6	10.200	9.8	12–14

USS 18-8 STAINLESS STEEL ANGLES

TYPE 302

Hot Rolled, Annealed and Pickled

Equal Leg

ANGLES

Size Inches	Estimated Weight Per Foot Pounds	Approx. Feet in 100 Pounds	Stock Lengths Feet
1 x 1 x 1/8	.80	125.0	20–22
1 1/4 x 1 1/4 x 1/8	1.01	99.0	20–22
1 1/2 x 1 1/2 x 1/8	1.23	81.0	20–22
1 1/2 x 1 1/2 x 3/16	1.80	56.0	20–22
2 x 2 x 1/8	1.65	61.0	20–22
2 x 2 x 3/16	2.44	41.0	20–22
2 x 2 x 1/4	3.19	31.0	20–22

USS 12-Z STAINLESS STEEL BARS
TYPE 416

Free Machining Grade — Ground Finish

ROUNDS

Size Inches	Estimated Weight Per Foot Pounds	Approx. Weight Per Bar Pounds	Approx. Feet in 100 Pounds	Stock Lengths Feet
1/4	.167	2.00	600.0	10–12
5/16	.261	3.13	383.0	10–12
3/8	.376	4.51	265.9	10–12
7/16	.511	6.13	195.6	10–12
1/2	.668	8.02	149.7	10–12
	.668	14.69	149.7	20–22
5/8	1.043	12.52	95.9	10–12
	1.043	22.95	95.9	20–22
3/4	1.502	18.02	66.6	10–12
	1.502	33.04	66.6	20–22
7/8	2.044	24.53	48.9	10–12
	2.044	44.97	48.9	20–22
1	2.670	32.04	37.5	10–12
	2.670	58.74	37.5	20–22
1 1/8	3.379	40.55	29.6	10–12
	3.379	79.34	29.6	20–22
1 1/4	4.173	50.07	24.0	10–12
	4.173	91.81	24.0	20–22
1 3/8	5.049	60.60	19.8	10–12
	5.049	111.10	19.8	20–22
1 1/2	6.008	72.10	16.6	10–12
	6.008	132.20	16.6	20–22
1 3/4	8.178	98.14	12.2	10–12
	8.178	179.92	12.2	20–22
2	10.681	128.20	9.3	10–12
	10.681	235.00	9.3	20–22

USS 12-Z STAINLESS STEEL BARS
TYPE 416

Free Machining Grade — Cold Drawn

HEXAGONS

Size Inches	Estimated Weight Per Foot Pounds	Approx. Weight Per Bar Pounds	Approx. Feet in 100 Pounds	Stock Lengths Feet
1/4	.184	2.57	543.0	12–14
5/16	.287	4.02	349.0	12–14
3/8	.414	5.80	242.0	12–14
7/16	.563	7.88	178.0	12–14
1/2	.736	10.30	136.0	12–14
9/16	.931	13.03	107.0	12–14
5/8	1.150	16.10	87.0	12–14
11/16	1.391	19.47	72.0	12–14
3/4	1.656	23.18	60.0	12–14
13/16	1.943	27.20	52.0	12–14
7/8	2.254	31.56	45.0	12–14
1	2.945	41.23	34.0	12–14
1 1/4	4.600	64.40	22.0	12–14

US Standard Thread Hex. Nuts carried in Stock: Pages 244 and 257

B & W CROLOY 18-8 S STAINLESS STEEL SEAMLESS PIPE

TYPE 304

.07 Max. Carbon — Annealed and White Pickled

Stock Lengths 20–22 Feet

Standard Pipe Size in Inches	Outside Diameter in Inches	Inside Diameter in Inches	Wall Thickness in Inches	Weight Per Foot Pounds
⅛	.405	.269	.068	.244
¼	.540	.364	.088	.424
⅜	.675	.493	.091	.567
½	.840	.622	.109	.850
¾	1.050	.824	.113	1.130
1	1.315	1.049	.133	1.678
1¼	1.660	1.380	.140	2.272
1½	1.900	1.610	.145	2.717
2	2.375	2.067	.154	3.652
2½	2.875	2.469	.203	5.793
3	3.500	3.068	.216	7.575
4	4.500	4.026	.237	10.790
5	5.563	5.047	.258	14.617
6	6.625	6.065	.280	18.974
Extra Heavy Pipe Size in Inches				
1	1.315	.457	.179	2.172
1½	1.900	1.500	.200	3.631
2	2.375	1.939	.218	7.661

In addition to the above list which we carry in stock for immediate shipment, we are prepared, as distributors for Babcock & Wilcox Tube Co., to furnish their complete range of alloys in both Pipe Sizes and Tubing Sizes, for both Corrosion Resistant and Heat Resistant applications.

The following list shows the various grades in which B & W CROLOY Pipe and Tubing can be furnished.

B & W CROLOY 2.....2% Cr—0.50% Mo
B & W CROLOY 5.....5% Cr—0.50% Mo
B & W CROLOY 9.....9% Cr—1.50% Mo
B & W CROLOY 18.....18% Cr
B & W CROLOY 18-8.....18% Cr—8% Ni
B & W CROLOY 16-13-3..16% Cr—13% Ni—3% Mo
B & W CROLOY 25-20....25% Cr—20% Ni
B & W CROLOY 27.....27% Cr

Stainless Steel Pipe Fittings shown on pages 250-251 are in stock for Immediate Delivery.

CARPENTER WELDED STAINLESS STEEL PIPE AND TUBING

Carpenter Welded Pipe and Tubing has many advantages. It is made from Cold Rolled Strip Steel and is therefore inherently sound and homogeneous. Both inside and outside surfaces of the tube represent surface metal from the original ingot. The weld is made automatically under exact control and is scarcely distinguishable from the rest of the tube—either physically or chemically.

Carpenter Stainless Welded Pipe and Tubing in the dead soft condition is sufficiently ductile at room temperatures for practically all bending operations. If possible the weld should be kept on the inside of the bend, or on neutral axis. This, however, is not absolutely necessary. Expanding operations can be satisfactorily performed with less tendency to crack than most stainless tubes. Carpenter welded pipe and tubing may also be soldered, welded, polished, machined, etc.

Send for folder giving detailed instructions for fabricating.

18-8 S STAINLESS STEEL WELDED PIPE

TYPE 304

.07 Max. Carbon — Annealed and Pickled

Pipe Size Inches	Outside Diameter Inches	Inside Diameter Inches	Wall Thickness Inches	Weight Per Foot Pounds	Stock Lengths Feet
⅛	.405	.269	.068	.244	20–22
¼	.540	.364	.088	.424	20–22
⅜	.675	.493	.091	.567	20–22
½	.840	.622	.109	.850	20–22
¾	1.050	.824	.113	1.130	20–22
1	1.315	1.049	.133	1.678	20–22
1¼	1.660	1.380	.140	2.272	20–22
1½	1.900	1.610	.145	2.717	20–22
2	2.375	2.067	.154	3.652	20–22

†18-8 S MO STAINLESS STEEL WELDED PIPE

TYPE 316 *Not Modified*

18-20% Cr 8-10% Ni 2-4% Mo

.07 Max. Carbon — Annealed and Pickled

Pipe Size Inches	Outside Diameter Inches	Inside Diameter Inches	Wall Thickness Inches	Weight Per Foot Pounds	Stock Lengths Feet
¼*	.540	.364	.088	.424	20–22
½*	.840	.622	.109	.850	20–22
¾*	1.050	.824	.113	1.130	20–22
1*	1.315	1.049	.133	1.678	20–22
1¼*	1.660	1.380	.140	2.272	20–22
1½*	1.900	1.610	.145	2.717	20–22
2*	2.375	2.067	.154	3.652	20–22

*Sizes thus marked Kenilworth, N. J., stock.

†It is important to note that this is the original full 18-8 S MO analysis containing the high Chromium and not the modified analysis with lower Chromium content which the present Type No. 316 also covers. The 18-8 S MO grade has many advantages for use in the dye and chemical industries. Because of the increasing demand for this grade our mill has in stock 18-8 S MO in the above Welded Pipe sizes and in the Welded Tubing sizes shown on the next page, both available for immediate delivery.

CARPENTER WELDED STAINLESS STEEL PIPE AND TUBING

It is always economical to take full advantage of the higher physical properties of Stainless tubing by using the lightest possible wall. There are several types of joints available for making pressure-tight connections on light gauge tubing. Fittings for these joints are being manufactured in Stainless Steel and information can be furnished on request.

18-8 S STAINLESS STEEL WELDED TUBING

TYPE 304

.07 Max. Carbon — Annealed and Pickled

Outside Diameter Inches	Wall - Thickness B.W.G.	Wall Thickness Inches	Inside Diameter Inches	Weight Per Foot Pounds	Stock Lengths Feet
½*	20	.035	.430	.17	20–22
⅜*	18	.049	.527	.30	20–22
⅜*	20	.035	.555	.22	20–22
¾	16	.065	.620	.48	20–22
¾	18	.049	.652	.37	20–22
¾	20	.035	.680	.27	20–22
⅞*	16	.065	.745	.56	20–22
1	16	.065	.870	.65	20–22
1*	18	.049	.902	.50	20–22
1	20	.035	.930	.36	20–22
1¼	16	.065	1.120	.82	20–22
1¼*	18	.049	1.152	.63	20–22
1¼	20	.035	1.180	.45	20–22
1⅜*	18	.049	1.277	.69	20–22
1½*	12	.109	1.282	1.62	20–22
1½	16	.065	1.370	1.00	20–22
1½*	18	.049	1.402	.76	20–22
1½*	20	.035	1.430	.55	20–22
2	16	.065	1.870	1.34	20–22
2*	18	.049	1.902	1.02	20–22
2*	20	.035	1.930	.73	20–22
2⅛*	14	.083	1.959	1.81	20–22
2½*	14	.083	2.334	2.14	20–22
2½*	16	.065	2.370	1.69	20–22
2½*	18	.049	2.402	1.28	20–22
3*	12	.109	2.782	3.37	20–22
3*	14	.083	2.834	2.59	20–22
3*	16	.065	2.870	2.04	20–22
3½*	14	.083	3.334	3.03	20–22
4*	12	.109	3.782	4.53	20–22
4*	14	.083	3.834	3.47	20–22

*Sizes thus marked Kenilworth, N. J., stock.

†18-8 S MO STAINLESS STEEL WELDED TUBING

TYPE 316 *Not modified*

18-20% Cr 8-10% Ni 2-4% Mo

.07 Max. Carbon — Annealed and Pickled

Outside Diameter Inches	Wall Thickness B.W.G.	Wall Thickness Inches	Inside Diameter Inches	Weight Per Foot Pounds	Stock Lengths Feet
¾*	16	.065	.620	.48	20–22
1*	16	.065	.870	.65	20–22
3*	14	.083	2.834	2.59	20–22
3½*	14	.083	3.334	3.03	20–22
4*	12	.109	3.782	4.53	20–22
4¼*	12	.109	4.032	4.82	20–22

*Sizes thus marked Kenilworth, N. J., stock.

†See note bottom of preceding page.

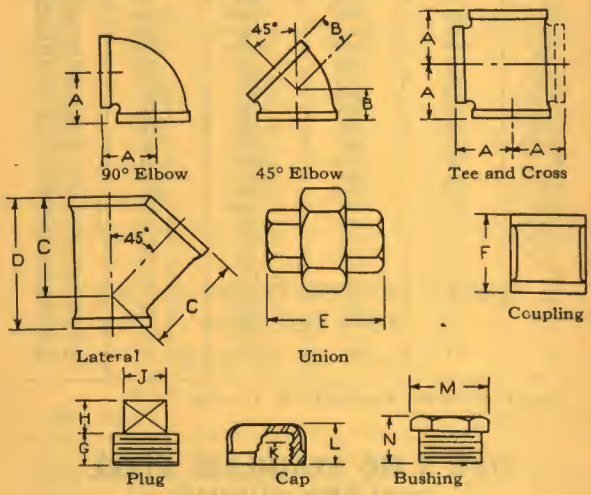
COOPER ALLOY
18-8 S (C.07-.10) STAINLESS STEEL
PIPE FITTINGS

Flat Band Screwed Type — 150 lbs. W.P.

90° Ells	45° Ells	Straight Tees	Caps	Plugs	Couplings	Unions
*1/8	*1/8	*1/8	*1/8	*1/8	*1/8	*1/8
1/4	1/4	1/4	1/4	1/4	1/4	1/4
3/8	3/8	3/8	3/8	3/8	3/8	3/8
1/2	1/2	1/2	1/2	1/2	1/2	1/2
3/4	3/4	3/4	3/4	3/4	3/4	3/4
1	1	1	1	1	1	1
1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
2	2	2	2	2	2	2
*2 1/2	*2 1/2	*2 1/2	*2 1/2	*2 1/2	*2 1/2	*2 1/2
*3	*3	*3	*3	*3	*3	*3
*4	*4	*4	*4	*4	*4	*4

*These sizes for immediate shipment from Factory stock. All others for immediate delivery from our Warehouse.

DIMENSIONS
OF FLAT BAND SCREWED TYPE FITTINGS



Dimensions in Inches

Size	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
A	13/16	15/16	1 1/8	1 5/16	1 1/2	1 3/4	1 15/16	2 1/4	2 11/16	3 1/16
B	3/4	13/16	7/8	1	1 1/8	1 5/16	1 7/16	1 11/16	1 15/16	2 3/16
C	1 3/16	1 7/16	1 3/4	2 1/16	2 7/16	2 15/16	3 1/4	3 15/16	4 3/4	5 9/16
D	1 5/8	1 15/16	2 5/16	2 3/4	3 5/16	3 15/16	4 3/8	5 3/16	6 1/4	7 1/4
E	1 5/8	1 3/4	1 7/8	2 1/8	2 3/8	2 5/8	2 15/16	3 1/4	3 9/16	3 15/16
F	1 1/16	1 3/16	1 5/16	1 1/2	1 11/16	1 15/16	2 1/8	2 1/2	2 7/8	3 3/16
G	13/32	13/32	17/32	9/16	11/16	23/32	3/4	3/4	1 1/16	1 1/8
H	9/32	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16
J	3/8	7/16	9/16	5/8	13/16	15/16	1 1/8	1 5/16	1 1/2	1 11/16
K	5/16	3/8	7/16	1/2	9/16	11/16	3/4	3/4	15/16	1
L	3/4	13/16	1	1 1/8	1 3/16	1 1/4	1 5/16	1 1/2	1 3/4	1 13/16
M	11/16	7/8	21/32	1 1/4	1 7/16	1 3/4	2	2 1/2	3	3 3/4
N	9/16	5/8	3/4	7/8	1	1 1/16	1 1/8	1 1/4	1 7/16	1 1/2

COOPER ALLOY
18-8 S (C .07—.10) STAINLESS STEEL
COMPANION FLANGES

150 lbs. W.P.

Size Inches	Outside Diam. Inches	Thickness Overall Inches	Diam. Bolt Circle Inches	Number of Bolts	Diam. Bolt Inches
½ x 3	3½	9/16	2⅜	4	½
¾ x 3½	3⅞	⅝	2¾	4	½
1 x 4¼	4¼	11/16	3⅛	4	½
1¼ x 4½	4⅝	13/16	3½	4	½
1½ x 5	5	⅞	3⅞	4	½
2 x 6	6	1	4¾	4	⅝
*2½ x 7	7	1⅛	5½	4	⅝
*3 x 7½	7½	1 3/16	6	4	⅝
*4 x 9	9	1 5/16	7½	8	⅝
*5 x 10	10	1 7/16	8½	8	¾
*6 x 11	11	1 9/16	9½	8	¾

*These sizes for immediate shipment from Factory stock. All others for immediate delivery from our Warehouse.

Horace T. Potts Co. are distributors for Cooper Alloy Foundry Co. for their line of Stainless Steel Pipe Fittings and Valves. As such we can furnish from Factory stock, or on special order, items not in our own stock such as: **Valves, Flanged Fittings, Blind Flanges, Plug and Stop Cocks, Return Bends, etc.**

We can also supply Fittings, Valves, etc., in alloys other than 18-8 such as: **18-8 S MO, 28% Cr, 25-12, etc.**

18-8 S STAINLESS STEEL
PIPE NIPPLES

.07 Max. Carbon — Std. Pipe Size and Thread

Standard Pipe Size Inches	Length of Nipples in Inches										
	Close	Short	Long								
⅛	¾	1½	1¾	2	2¼	2½	3	3½	4	5	6
¼	⅞	1½	1¾	2	2¼	2½	3	3½	4	5	6
⅜	1	1½	1¾	2	2¼	2½	3	3½	4	5	6
½	1⅛	1½	1¾	2	2¼	2½	3	3½	4	5	6
¾	1⅜	2	2½	3	4	5	6	7	8	9	10
1	1½	2	2½	3	4	5	6	7	8	9	10
1¼	1⅝	2½	3	4	5	6	7	8	9	10	12
1½	1¾	2½	3	4	5	6	7	8	9	10	12
2	2	2½	3	4	5	6	7	8	9	10	12
2½	2½	3	4	5	6	7	8	9	10	12	
3	2⅝	3	4	5	6	7	8	9	10	12	

Above Nipples from stock—Intermediate and longer lengths can be furnished at once.

Consult pages 247-248 for complete Warehouse Stock of Seamless and Welded 18-8 S Stainless Steel Pipe.

hiladelphia
Gent 7450
ark 5351
Baltimore
rnon 8260
FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS
Fittings Valves
Bolts, Nuts, etc. Welding Rods

Philadelpi
REGent 7
Park 535

Baltimor
Vernon 82

PRATT & CADY STAINLESS STEEL BAR STOCK VALVES

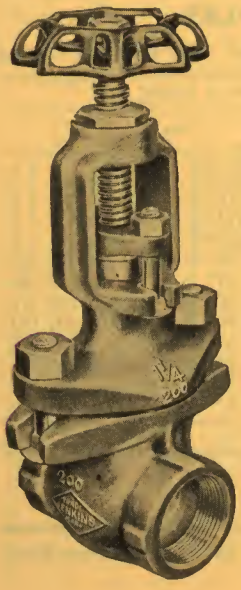
18-8 Stainless and 12/14% Cr Stainless Steels

Type	Pipe Size Inches	End to End	Center to End of Outlet	Center to Top of Handwheel	Diameter of Port
Globe	1/8	1 7/16	...	3 5/16	3/16
Angle	1/8	...	23/32	3 1/4	3/16
Globe	1/4	1 13/16	...	3 5/16	3/16
Angle	1/4	...	29/32	3 3/8	3/16
Globe	3/8	2 1/16	...	3 7/8	1/4
Angle	3/8	...	1 1/32	4	1/4
Globe	1/2	2 3/8	...	4 3/8	5/16
Angle	1/2	...	1 3/16	4 5/16	5/16

The above Bar Stock Valves are in Philadelphia stock in both 18-8 and 12/14% Cr Stainless Steels, except Angle valves of 18-8 Stainless are carried only in 1/2" size. Can obtain 3/4" and 1" promptly from factory stock.

Stainless Steel Bar Stock Valves manufactured by Reading-Pratt & Cady Company, Inc., are precision turned from Free Machining grades of Stainless Steel in both the 12/14% Chromium and the 18% Chromium 8% Nickel types. *These valves are low in price.* They fill the need for close control valves capable of withstanding high working temperatures and pressure.

The pipe threads on all Bar Stock Valves are considerably longer than the effective length called for in the American Standards and in the American Petroleum Institute Standards. Ports are of a larger diameter than ordinarily found in small plug type valves. Their area is the same as that of double extra heavy pipe. The extra rugged stems of scientifically designed threads are always in contact. The pitch is sufficiently fine to give close control.



JENKINS BROTHERS STAINLESS STEEL VALVES

These are the famous JENKINS BROTHERS VALVES made of 18-8 S and 18-8 S MO Alloy Steel, cast by the COOPER ALLOY FOUNDRY COMPANY for whom we are distributors. The 18-8 S stock valves average 19% Chromium, 9% Nickel; Carbon content .07/.10.

For extreme corrosion conditions, the 18-8 S MO may be supplied, also other alloy specifications to resist corrosion, heat or abrasion. These valves are specially designed for use in the process industries, textile, paper, food and other industrial applications. A COMPLETE FILE FOLDER including all essential information, blue prints, dimensions, etc., will be supplied upon request.

18-8 STAINLESS STEEL MACHINE SCREWS

ROUND HEAD

Diameter and No. of Threads		Length Inches	Diameter and No. of Threads		Length Inches	Diameter and No. of Threads		Length Inches
2-56	x	1/8	8-32	x	5/8	12-24	x	1 1/2
2-56	x	3/16	8-32	x	3/4	1/4-20	x	1/4
2-56	x	1/4	8-32	x	1	1/4-20	x	5/16
2-56	x	5/16	8-32	x	1 1/8	1/4-20	x	3/8
2-56	x	3/8	8-32	x	1 1/4	1/4-20	x	1/2
2-56	x	1/2	8-32	x	1 1/2	1/4-20	x	5/8
3-48	x	1/2	10-24	x	1/4	1/4-20	x	3/4
4-36	x	3/4	10-24	x	5/16	1/4-20	x	7/8
4-40	x	3/16	10-24	x	3/8	1/4-20	x	1
4-40	x	3/8	10-24	x	7/16	1/4-20	x	1 1/8
4-40	x	1/2	10-24	x	1/2	1/4-20	x	1 1/4
4-40	x	7/8	10-24	x	5/8	1/4-20	x	1 3/8
5-40	x	1/4	10-24	x	3/4	1/4-20	x	1 1/2
5-40	x	3/8	10-24	x	7/8	1/4-20	x	1 3/4
5-40	x	1/2	10-24	x	1	1/4-20	x	2
5-40	x	5/8	10-24	x	1 1/4	1/4-20	x	2 1/2
5-40	x	3/4	10-24	x	1 1/2	1/4-20	x	3
6-32	x	1/8	10-24	x	1 3/4	5/16-18	x	3/8
6-32	x	3/16	10-24	x	2	5/16-18	x	1/2
6-32	x	1/4	10-24	x	2 1/2	5/16-18	x	3/4
6-32	x	5/16	10-32	x	1/4	5/16-18	x	7/8
6-32	x	3/8	10-32	x	5/16	5/16-18	x	1
6-32	x	7/16	10-32	x	3/8	5/16-18	x	1 1/2
6-32	x	1/2	10-32	x	1/2	5/16-18	x	1 3/4
6-32	x	5/8	10-32	x	5/8	5/16-18	x	2
6-32	x	3/4	10-32	x	3/4	5/16-18	x	2 1/2
6-32	x	1	10-32	x	1	5/16-18	x	2 3/4
6-32	x	1 1/4	10-32	x	1 1/4	5/16-18	x	3
6-32	x	1 1/2	10-32	x	1 1/2	3/8-16	x	1/2
6-40	x	1/4	10-32	x	1 3/4	3/8-16	x	3/4
6-40	x	3/8	10-32	x	2	3/8-16	x	1
6-40	x	1	12-24	x	1/4	3/8-16	x	1 1/4
8-32	x	3/16	12-24	x	3/8	3/8-16	x	1 1/2
8-32	x	1/4	12-24	x	1/2	3/8-16	x	1 3/4
8-32	x	5/16	12-24	x	5/8	3/8-16	x	2
8-32	x	3/8	12-24	x	3/4	3/8-16	x	2 1/2
8-32	x	7/16	12-24	x	1	3/8-16	x	3
8-32	x	1/2	12-24	x	1 1/4			

18-8 STAINLESS STEEL MACHINE SCREWS

FLAT HEAD

Diameter and No. of Threads		Length Inches	Diameter and No. of Threads		Length Inches	Diameter and No. of Threads		Length Inches
2-56	x	3/16	4-40	x	3/8	6-32	x	1 1/2
2-56	x	1/4	6-32	x	1/4	6-40	x	1/4
2-56	x	5/16	6-32	x	5/16	6-40	x	3/8
2-56	x	3/8	6-32	x	3/8	6-40	x	1/2
3-48	x	1/4	6-32	x	7/16	6-40	x	3/4
3-48	x	5/16	6-32	x	1/2	8-32	x	1/4
3-48	x	3/8	6-32	x	5/8	8-32	x	5/16
3-48	x	1/2	6-32	x	3/4	8-32	x	3/8
4-36	x	1/2	6-32	x	1	8-32	x	1/2
4-40	x	1/4	6-32	x	1 1/4	8-32	x	5/8

FLAT HEAD MACHINE SCREWS continued on next page.
All items on this page Factory stock sizes.

Philadelphia
LGent 7450
Park 5351
Baltimore
Arnon 8260
FENCES
INDEX
Technical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS
Bolts, Nuts, etc.
Welding Rods

Philadelp
REGent 7
Park 535

Baltimor
Vernon 82

18-8 STAINLESS STEEL MACHINE SCREWS

FLAT HEAD

Diameter and No. of Threads		Length Inches	Diameter and No. of Threads		Length Inches	Diameter and No. of Threads		Length Inches
8–32	x	¾	10–32	x	2	5/16–18	x	¾
8–32	x	1	12–24	x	½	5/16–18	x	1
8–32	x	1¼	12–24	x	1	5/16–18	x	1¼
8–32	x	1½	¼–20	x	½	5/16–18	x	1½
10–24	x	⅜	¼–20	x	¾	5/16–18	x	2
10–24	x	½	¼–20	x	15/16	5/16–18	x	2¼
10–24	x	⅝	¼–20	x	1	5/16–18	x	2¾
10–24	x	¾	¼–20	x	1⅛	5/16–18	x	3
10–24	x	1	¼–20	x	1¼	⅜–16	x	¾
10–24	x	1¼	¼–20	x	1¾	⅜–16	x	1
10–24	x	1½	¼–20	x	2¼	⅜–16	x	1¼
10–32	x	¼	¼–20	x	2¾	⅜–16	x	1½
10–32	x	½	¼–20	x	3	⅜–16	x	1¾
10–32	x	¾	5/16–18	x	½	⅜–16	x	2
10–32	x	1	5/16–18	x	⅝			
10–32	x	1½						

18-8 STAINLESS STEEL MACHINE SCREWS

OVAL HEAD

Diameter and No. of Threads		Length Inches	Diameter and No. of Threads		Length Inches	Diameter and No. of Threads		Length Inches
2–56	x	5/16	8–32	x	1	10–32	x	1½
2–56	x	7/16	8–32	x	1¼	10–32	x	2
4–40	x	5/16	8–32	x	1½	12–24	x	½
4–40	x	⅜	8–32	x	2	12–24	x	1½
4–40	x	7/16	10–24	x	5/16	¼–20	x	⅜
4–40	x	½	10–24	x	⅜	¼–20	x	½
6–32	x	¼	10–24	x	½	¼–20	x	9/16
6–32	x	5/16	10–24	x	⅝	¼–20	x	¾
6–32	x	⅜	10–24	x	¾	¼–20	x	1
6–32	x	½	10–24	x	1	¼–20	x	1¼
6–32	x	⅝	10–24	x	1¼	¼–20	x	1½
6–32	x	¾	10–24	x	1½	¼–20	x	1¾
6–32	x	1	10–24	x	2	¼–20	x	2
6–32	x	1¼	10–32	x	5/16	5/16–18	x	½
8–32	x	5/16	10–32	x	⅜	5/16–18	x	¾
8–32	x	⅜	10–32	x	½	5/16–18	x	1
8–32	x	7/16	10–32	x	⅝	5/16–18	x	1¼
8–32	x	½	10–32	x	¾	5/16–18	x	1½
8–32	x	⅝	10–32	x	1	⅜–16	x	¾
8–32	x	¾	10–32	x	1¼	⅜–16	x	1
8–32	x	⅞				⅜–16	x	1½

18-8 STAINLESS STEEL FLAT HEAD TINNERS RIVETS

Size	Size	Size	Size
8 oz.	1¼ lb.	2½ lb.	5 lb.
12 oz.	1½ lb.	3 lb.	6 lb.
1 lb.	2 lb.	4 lb.	8 lb.

All items on this page Factory stock sizes.

18-8 STAINLESS STEEL RIVETS

ROUND HEAD

Diameter		Length	Diameter		Length	Diameter		Length
1/16	x	1/8	5/32	x	3/8	5/16	x	1/2
1/16	x	5/16	5/32	x	5/8	5/16	x	5/8
1/16	x	1/4	3/16	x	1/4	5/16	x	3/4
1/16	x	1/2	3/16	x	5/16	5/16	x	13/16
3/32	x	5/16	3/16	x	3/8	5/16	x	7/8
3/32	x	1/4	3/16	x	7/16	5/16	x	1
3/32	x	5/16	3/16	x	1/2	5/16	x	1 1/4
3/32	x	3/8	3/16	x	5/8	5/16	x	1 1/2
3/32	x	1/2	3/16	x	3/4	5/16	x	1 3/4
1/8	x	5/16	3/16	x	7/8	5/16	x	2
1/8	x	15/64	3/16	x	1	5/16	x	2 1/2
1/8	x	1/4	3/16	x	1 1/4	5/16	x	3
1/8	x	5/16	3/16	x	1 1/2	3/8	x	5/8
1/8	x	3/8	1/4	x	3/8	3/8	x	3/4
1/8	x	7/16	1/4	x	7/16	3/8	x	7/8
1/8	x	1/2	1/4	x	1/2	3/8	x	1
1/8	x	5/8	1/4	x	5/8	3/8	x	1 1/4
1/8	x	3/4	1/4	x	3/4	3/8	x	1 1/2
1/8	x	7/8	1/4	x	7/8	3/8	x	1 3/4
1/8	x	1	1/4	x	1	3/8	x	2
1/8	x	1 1/8	1/4	x	1 1/8	3/8	x	2 1/4
1/8	x	1 3/16	1/4	x	1 1/4	3/8	x	2 1/2
1/8	x	1 5/16	1/4	x	1 1/2	3/8	x	3
5/32	x	15/64	1/4	x	1 3/4	3/8	x	4
5/32	x	15/64	1/4	x	2	1/2	x	1
5/32	x	5/16	1/4	x	2 1/2			

COUNTERSUNK HEAD

Diameter		Length	Diameter		Length	Diameter		Length
3/32	x	7/16	3/16	x	1	5/16	x	7/8
1/8	x	1/4	3/16	x	1 1/4	5/16	x	1
1/8	x	5/16	3/16	x	1 1/2	5/16	x	1 1/4
1/8	x	3/8	1/4	x	3/8	5/16	x	1 1/2
1/8	x	1/2	1/4	x	1/2	5/16	x	1 3/4
1/8	x	5/8	1/4	x	5/8	5/16	x	2
1/8	x	3/4	1/4	x	3/4	5/16	x	2 1/2
1/8	x	1	1/4	x	7/8	5/16	x	3
1/8	x	1 1/4	1/4	x	1	3/8	x	3/4
5/16	x	3/8	1/4	x	1 1/4	3/8	x	1
3/16	x	1/2	1/4	x	1 1/2	3/8	x	1 3/16
3/16	x	5/8	5/16	x	1/2	3/8	x	1 1/2
3/16	x	3/4	5/16	x	5/8	3/8	x	1 3/4
3/16	x	7/8	5/16	x	3/4	3/8	x	2

FLAT HEAD

Diameter		Length	Diameter		Length	Diameter		Length
1/8	x	1/8	5/32	x	3/4	1/4	x	3/4
1/8	x	3/16	5/32	x	1	1/4	x	7/8
1/8	x	1/4	3/16	x	1/4	1/4	x	1
1/8	x	3/8	3/16	x	5/16	1/4	x	1 1/4
1/8	x	1/2	3/16	x	3/8	1/4	x	1 1/2
1/8	x	5/8	3/16	x	1/2	5/16	x	3/8
1/8	x	3/4	3/16	x	5/8	5/16	x	1/2
1/8	x	1	3/16	x	3/4	5/16	x	5/8
5/32	x	3/8	3/16	x	1	5/16	x	3/4
5/32	x	1/2	1/4	x	1/2	5/16	x	7/8
5/32	x	5/8	1/4	x	5/8	5/16	x	1

All items on this page Factory stock sizes.

hiladelphia
Gent 7450
ark 5351

Baltimore
rnon 8260

FENCES
INDEX
chnical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

18-8 STAINLESS STEEL MACHINE BOLTS AND CAP SCREWS

HEXAGON HEAD

Diameter Bolt Inches		Length Inches	Diameter Bolt Inches		Length Inches	Diameter Bolt Inches		Length Inches
1/4	x	1/2	3/8	x	1 1/2	5/8	x	1 3/4
1/4	x	3/4	3/8	x	1 3/4	5/8	x	2
1/4	x	1	3/8	x	2	5/8	x	2 1/2
1/4	x	1 1/4	3/8	x	2 1/4	5/8	x	3
1/4	x	1 1/2	3/8	x	2 1/2	5/8	x	3 1/2
1/4	x	1 3/4	3/8	x	3	5/8	x	4
1/4	x	2	3/8	x	3 1/2	5/8	x	5
1/4	x	2 1/4	3/8	x	4	5/8	x	6
1/4	x	2 1/2	7/16	x	2	3/4	x	1 1/2
1/4	x	3	1/2	x	3/4	3/4	x	1 3/4
1/4	x	4	1/2	x	1	3/4	x	2
1/4	x	5	1/2	x	1 1/4	3/4	x	2 1/2
1/4	x	6	1/2	x	1 3/8	3/4	x	3
5/16	x	1/2	1/2	x	1 1/2	3/4	x	3 1/2
5/16	x	3/4	1/2	x	1 3/4	3/4	x	4
5/16	x	1	1/2	x	2	3/4	x	4 1/2
5/16	x	1 1/4	1/2	x	2 1/2	3/4	x	5
5/16	x	1 1/2	1/2	x	3	3/4	x	5 1/2
5/16	x	1 3/4	1/2	x	3 1/2	3/4	x	6
5/16	x	2	1/2	x	4	3/4	x	7
5/16	x	2 1/4	1/2	x	4 1/2	3/4	x	8
5/16	x	2 1/2	1/2	x	5	3/4	x	11
5/16	x	3	1/2	x	6			
3/8	x	1/2	1/2	x	8			
3/8	x	3/4	1/2	x	8 1/2			
3/8	x	1	5/8	x	1 1/4			
3/8	x	1 1/4	5/8	x	1 1/2			

18-8 STAINLESS STEEL LOCK WASHERS AND FLAT WASHERS

Bolt Sizes											
#4	#6	#8	#10	5/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1

18-8 STAINLESS STEEL COTTER PINS

Diameter Inches		Length Inches	Diameter Inches		Length Inches	Diameter Inches		Length Inches
3/64	x	1/2	3/32	x	1	1/8	x	3
3/64	x	5/8	3/32	x	1 1/4	5/32	x	1
3/64	x	3/4	3/32	x	1 1/2	5/32	x	1 1/2
1/16	x	1/2	1/8	x	3/4	5/32	x	2
1/16	x	3/4	1/8	x	1	3/16	x	1
1/16	x	1	1/8	x	1 1/4	3/16	x	1 1/4
1/16	x	1 1/2	1/8	x	1 1/2	3/16	x	1 1/2
1/16	x	2	1/8	x	1 3/4	3/16	x	2
3/32	x	3/4	1/8	x	2	3/16	x	3

All items on this page Factory stock sizes.

18-8 STAINLESS STEEL HEXAGON NUTS

U. S. Standard Thread

Bolt Size	Across Flats	Thickness	No. of Threads
3/16	3/8	3/16	..
1/4	1/2	1/4	20
5/16	19/32	5/16	18
3/8	11/16	3/8	16
1/2	7/8	1/2	13
5/8	1 1/16	5/8	11
3/4	1 1/4	3/4	10
1	1 5/8	1	8

18-8 STAINLESS STEEL HEXAGON MACHINE SCREW NUTS

Screw Size	No. of Threads	Screw Size	No. of Threads
2	56	8	36
3	48	10	24
4	36	10	32
4	40	12	24
6	32	1/4	20
8	32	5/16	18
		3/8	16

18-8 STAINLESS STEEL WING NUTS

Screw Size	No. of Threads	Screw Size	No. of Threads
10	24	5/16	18
10	32	3/8	16
12	24	1/2	13
1/4	20		

18-8 STAINLESS STEEL WIRE NAILS

Length Inches	Size Stubs Gauge	Length Inches	Size Stubs Gauge
5/8	16	1 3/4	13
3/4	16	2	10
1	16	2 1/2	10
1	12	3	10
1 1/4	13	3 1/2	10
1 1/2	12	4	8

Hexagon Nuts Philadelphia stock, other items Factory stock sizes.

Philadelpl
REGent 74
Park 535

Baltimor
Vernon 82

18-8 STAINLESS STEEL ROUND HEAD WOOD SCREWS

Length Inches	Size Number	Length Inches	Size Number	Length Inches	Size Number
½	6	1	12	1½	14
¾	6	1¼	8	2	12
¾	8	1¼	10	2	14
1	6	1¼	12	2½	14
1	8	1½	10		
1	10	1½	12		

18-8 STAINLESS STEEL FLAT HEAD WOOD SCREWS

Length Inches	Size Number	Length Inches	Size Number	Length Inches	Size Number
½	6	1¼	6	1¾	12
¾	4	1¼	7	1¾	14
¾	6	1¼	8	1¾	16
¾	8	1¼	10	2	12
¾	10	1¼	12	2	14
1	6	1¼	14	2	16
1	7	1½	10	2½	16
1	8	1½	12	3	16
1	10	1½	14	4	16
1	12	1¾	10	4	20

18-8 STAINLESS STEEL OVAL HEAD WOOD SCREWS

Length Inches	Size Number	Length Inches	Size Number	Length Inches	Size Number
½	6	1¼	6	1½	14
¾	6	1¼	8	2	10
¾	8	1¼	10	2	12
1	6	1¼	12	2	14
1	8	1½	10	3	10
1	10	1½	12		
1	12				

18-8 STAINLESS STEEL SHEET METAL SCREWS

Length Inches	Size Number	Length Inches	Size Number	Length Inches	Size Number
¼	4	½	8	⅝	10
⅜	6	½	10	⅝	14
⅜	8				

All items above are Factory stock sizes.

18-8 STAINLESS STEEL WIRE ROPE

(See page 120)

POTTSCO 19-9 S STAINLESS STEEL WELDING WIRES

Available for either Gas or Electric Welding. Gas wires are furnished bare. Electrodes are coated for shielded-arc type of electric welding. This coating is designed to improve the welding qualities of the electrode and also compensate for changes in analysis which would otherwise occur during the welding operation.

POTTSCO 19-9 S Stainless Steel Gas Wires and Electrodes produce weld metal which is ductile and corrosion resistant. Welds can be machined and will take a high polish. They are resistant to corrosion from atmospheric and other moistures, salt water, milk, foodstuffs and most organic or inorganic chemicals.

POTTSCO 19-9 S is used more widely than any other stainless steel grade. However, where it is desirable to use exactly the same metal type as in the part being welded, POTTSCO Gas Wires and Electrodes are available in any standard stainless steel alloy. See partial list below all of which are ready for prompt shipment.

POTTSCO 19-9 S STAINLESS STEEL ELECTRODES

(Page-Allegheny)
TYPE 306

Sizes for Immediate Shipment

Diameter	1/16"	3/32"	1/8"	5/32"	3/16"	1/4"
Length	15"	15"	15"	15"	15"	15"
Standard Package Pounds	10 and 25	10 and 25	10 and 25	10 and 25	10 and 25	10 and 25

POTTSCO 19-9 S Electrodes can also be furnished with Titanium or Columbium or with 2/4% Molybdenum.

POTTSCO 19-9 S STAINLESS STEEL GAS WELDING RODS

(Page-Allegheny)
TYPE 306

Sizes for Immediate Shipment

Diameter	1/16"	3/32"	1/8"	5/32"	3/16"	1/4"
Length	30"	30"	30"	30"	30"	30"
Standard Package Pounds	10 and 25	10 and 25	10 and 25	10 and 25	10 and 25	10 and 25

POTTSCO 19-9 S Gas Rods can also be furnished with Titanium or Columbium, or with 2/4% Molybdenum.

OTHER POTTSCO STAINLESS STEEL GAS RODS AND ELECTRODES AVAILABLE FOR PROMPT SHIPMENT

POTTSCO 25-12—Cr Ni
POTTSCO 25-20—Cr Ni
POTTSCO 18-8 S MO—Cr Ni
POTTSCO 15-35—Ni Cr
POTTSCO 19-10 Cb—Cr Ni Stab.
POTTSCO 13—Chrome
POTTSCO 17—Chrome
POTTSCO 27—Chrome
POTTSCO 4-6—Chrome

FENCES

We are District Distributors for:

PAGE STEEL & WIRE DIVISION OF AMERICAN CHAIN & CABLE CO., INC.

Page Chain Link Fences.

Page Panel Partitions.

Page Wrought Iron Picket Fences.

HABITANT SHOPS, INC.

Habitant White Cedar Fence.

CHAIN LINK FENCES

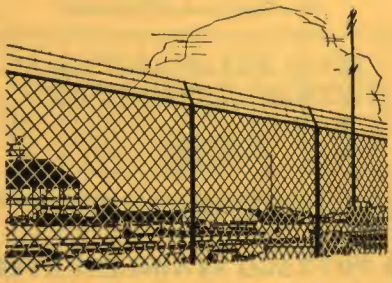
We can furnish Chain Link Fabric made of any of the following four metals:

Copper Bearing Steel: P-12, containing not less than 0.20% copper by ladle analysis. The zinc coating on P-12 fabric is guaranteed to withstand twelve one-minute immersions under the Preece Test.

Armco Ingot Iron: 99.94% pure iron. Strongly rust resisting, heavily galvanized after weaving.

Page-Alcoa Aluminum. Woven from aluminum alloy drawn wire.

Page-Allegheny Stainless Steel.



Type 3TR. Particularly suited for factory, transformer enclosures or for wherever the greatest protection from intrusion is required.

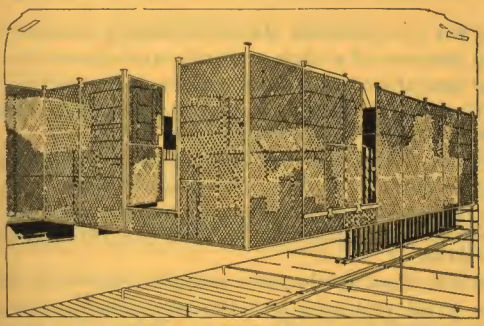
Can be furnished in any height.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

FENCES

RELIABLE STYLE can be furnished in height to suit, and design adaptable to your location. Write for special catalog.



PAGE PANEL PARTITIONS are made of Chain Link fabric woven into channel frames. They make a very economical enclosure. We can also furnish Diamond Mesh Partitions, both black and galvanized.

IRON PICKET FENCES can be furnished in either steel or genuine wrought iron. Wrought iron resists rust and will outlast steel many times. Iron Picket Fences are made in a large number of designs and heights. Special sketches and suggestions furnished without charge. We can handle any size job.

HABITANT FENCING is made of only the choicest materials especially selected from Northern White Cedar. Habitant Fencing requires no painting, as the elements turn it to a soft silver gray which blends with harmony into any setting. Furnished in many designs, including Hurdle and Post and Rail. We can also furnish Chestnut Post and Rail as well as French Woven Picket Fence.

When sending for catalog, please indicate the kind of fence desired.

FENCES
INDEX
Technical Data
GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

USEFUL INFORMATION

To find the circumference of a circle multiply diameter by 3.1416.

To find diameter of a circle multiply circumference by .31831.

To find area of a circle multiply square of diameter by .7854.

Area of rectangle. Length multiplied by breadth. Doubling the diameter of a circle increases its area four times.

To find area of a triangle multiply base by ½ perpendicular height.

To find surface of a ball multiply square of diameter by 3.1416.

To find side of an inscribed square multiply diameter by 0.7071 or multiply circumference by 0.2251 or divide circumference by 4.4428.

To find side of an equal square multiply diameter by .8862.

Square. A side multiplied by 1.4142 equals diameter of its circumscribing circle.

A side multiplied by 4.443 equals circumference of its circumscribing circle.

A side multiplied by 1.128 equals diameter of an equal circle.

A side multiplied by 3.547 equals circumference of an equal circle.

Square inches multiplied by 1.273 equals circle inches of an equal circle

To find cubic inches in a ball multiply cube of diameter by .5236.

To find cubic contents of a cone, multiply area of base by ⅓ the altitude.

Doubling the diameter of a pipe increases its capacity four times.

A gallon of water (U. S. Standard) weighs 8⅓ lbs. and contains 231 cubic inches.

A cubic foot of water contains 7½ gallons, 1728 cubic inches and weighs 62½ lbs.

To find the pressure in pounds per square inch of a column of water multiply the height of the column in feet by 434.

Steam rising from water at its boiling point (212 degrees) has a pressure equal to the atmosphere (14.7 lbs. to the square inch).

A standard horse power: The evaporation of 30 lbs. of water per hour from a feed water temperature of 100° F. into steam at 70 lbs. gauge pressure.

To find capacity of tanks any size: given dimensions of a cylinder in inches, to find its capacity in U. S. gallons: Square the diameter, multiply by the length and by .0034.

To ascertain heating surface in tubular boilers multiply ⅔ the circumference of boiler by length of boiler in inches and add to it the area of all the tubes.

One-sixth of tensile strength of plate multiplied by thickness of plate and divided by one-half the diameter of boiler gives safe working pressure for tubular boilers. For marine boilers add 20 per cent for drilled holes.

To find the capacity of an air compressor in cubic feet of free air per minute: Multiply the area of low pressure cylinder (on compound compressor), or area of simple compressor cylinder in square inches, by the stroke in inches, and divide by 1728 and multiply this result—

(a) In single acting, simple or compound, by the R. P. M.
(b) Double acting, simple or compound, by 2 × R. P. M.
(c) Duplex double acting, by 4 × R. P. M.

INDEX

LISTING CONTENTS PAGES 263-303

TECHNICAL DATA

Page

Temper Classification Chart 264
Table of Comparative Hardness 265
Table of Comparative Physical Properties 266
The Use of Physical Properties in Specifications for Steel 267
Official S.A.E. Steel Specifications 268-270
Explanation of the S.A.E. Numbering System 271

GAUGES AND WEIGHTS

Page

Standard Gauges Equivalent in Decimals of an Inch .. 272
United States Standard Weight of Gauges for Steel Plates and Sheets 273
Fractional of an Inch in Equivalent Decimals for Use in Connection with Micrometer Calipers 274
Decimal of a Foot Equivalent to Inches and Fraction of an Inch 275
Weight Per Foot—Bar Steel { Round and Square ..... 276; Octagon and Hexagon .. 277; Flat Rolled ..... 278-285 }
Theoretical Weight of Steel Circles 286-287
Circumference and Area of Steel Circles 288-291

EXTRAS AND DEDUCTIONS FOR

Page

Size—Tool Steel 292
High Speed Steel 293
Quantity—Alloy Machinery Steel 294
Tool Steel 294
High Speed Steel 294
Annealing 294
Heat Treating 294
Warehouse Quantity—Hot Rolled Finish (Except Alloy Machinery Steel) 295
Cold Finished Steel 295
Concrete Reinforcing Bars 295

CUTTING EXTRAS

Page

Tool Steel—Saw Cutting 296
High Speed—Saw Cutting 297
Alloy Machinery Steel—Saw Cutting 298
All Steels (Except Alloy Machy., Tool, High Speed)
Saw Cutting 299-302
Shearing 303
Flame Cutting ..... On Application

Temper Classification Chart

The tempers given below refer solely to the carbon content of the bars and not to the grade or quality. This point should be borne in mind in ordering, and steel be specified by size and purpose, leaving to our judgment the grade and temper best suited.

No. 12 Temper—1.15 to 1.25 Carbon

Tubedrawing Dies
Roll Cutting Tools
Reamers
Taps
Wortle Dies
Razor Blades
Drills
Wood-moulding Knives
Peen Hammers
Mandrels
Screw Dies
Steel Saws
Surgical Instruments
Engravers' Tools
Fine Finishing Tools
Files
Wire-drawing Dies
Bush Hammers (Stone)
Surfacing Tools (Stone)
Tools for Brass and Non-ferrous Metals
Circular Cutters of All Kinds

No. 11 Temper—1.05 to 1.15 Carbon

This is the best all-around temper, being suitable for all the above-mentioned purposes when ordered in the proper grade and, in addition, for the following purposes:

Milling Cutters
Woodworking Tools
Threading Dies
Planer Tools
Trimming Dies
Ball Bearings
Large Milling Cutters
Scale Pivots
Blanking, Punching and Drawing Dies
Hard Rock Drills
Lawn Mower Knives
Shaper Tools
Paper Knives
Twist Drills
Nail Dies
Carpenters' Chisels
Shear Blades
Cross-cut Saws
Cold-drawing Dies
Permanent Magnets
Knock-off Blocks
Cold Heading Dies
Stone Tools
Sprue Cutters

No. 9½ Temper—.90 to 1.00 Carbon

Large Punches and Dies
Forming Dies
Forging Dies
Brake Dies
Trimming Dies
Plug Drills
Cant Dogs
Springs
Large Shear Knives
Pruning Knives
Farrier's Knives

No. 9 Temper—.85 to .95 Carbon

Cold Sets
Lathe Centers
Small Rivet Sets
Wood Saws
Clinker Bars
Mandrels
Arbors

No. 8½ Temper—.80 to .90 Carbon

Hand Chisels
Cold Cutters
Blacksmith Tools
Beading Tools
Pneumatic Chisels
Boilermakers' Tools
Flogging Chisels
Machinists' Hammers

No. 8 Temper—.75 to .85 Carbon

Smith Shop Tools
Cupping Tools
Hot Forging Dies
Drift Pins
Pinch Bars
Hot Punches
Cant Hooks
Caulking Tools
Axes
Axe Bits
Tongs
Pneumatic Hammer Cylinders
Leather Cutting Dies
Nut Punches (Cold)
Rivet Machine Dies
Hand Chisels
Pneumatic Chisels
Chuck Jams
Cold Sets
Hot Chisels
Bolt Dies

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

TEMPER CLASSIFICATION CHART

No. 7 Temper—.65 to .75 Carbon

Drop Hammer Dies
Bolt and Rivet Headers
Bull Sets
Pneumatic Hammer Tools
Set Screws
Well Bits
Wedges
Surface Plates
Fullers
Flatters
Bucket Teeth
Vise Jaws
Sledges
Masons' Tools
Logging Hooks
Road Drags

No. 6 Temper—.55 to .65 Carbon

Nigger Bar Steel
Brick Chisels
Tongs
Pick Points
Drop Hammer Dies
Valve Links

TABLE OF COMPARATIVE HARDNESS

Brinell (3000 Kg.)		Rockwell		Shore Scleroscope
Diameter	Number	C	B	
2.20	780	68	..	100
2.25	745	67	..	97
2.30	712	66	..	94
2.35	682	64	..	90
2.40	653	63	..	87
2.45	627	62	..	83
2.50	601	60	..	80
2.55	578	58	..	77
2.60	555	56	..	74
2.65	534	55	..	72
2.70	514	53	..	69
2.75	495	52	..	67
2.80	477	50	..	65
2.85	461	48	..	62
2.90	444	46	..	59
2.95	429	44	..	56
3.00	415	42	..	54
3.05	401	41	..	52
3.10	388	39	..	50
3.15	375	38	..	49
3.20	363	37	..	47
3.25	352	36	..	46
3.30	341	35	..	45
3.35	331	34	..	44
3.40	321	33	..	43
3.45	311	32	..	42
3.50	302	31	106	41
3.55	293	30	105	40
3.60	285	29	104	39
3.65	277	28	103	38
3.70	269	27	102.5	37
3.75	262	26	102	36
3.80	255	25	101	35
3.85	248	24	100	34
3.90	241	23	99.5	33
3.95	235	22	99	32
4.00	229	21	98	31
4.05	223	20	97	30
4.10	217	19	96	29
4.15	212	18	95.5	28
4.20	207	17	94.5	27
4.25	201	16	93.5	26
4.30	197	15	93	25
4.35	192	14	92	24
4.40	187	12	91	23
4.45	183	11	90	22
4.50	179	10	88	21
4.55	174	..	87	20
4.60	170	..	86	19
4.65	167	..	85	19
4.70	163	..	84	18
4.75	159	..	83	18
4.80	156	..	82	18
4.85	152	..	81	17
4.90	149	..	80	17
4.95	146	..	79	17
5.00	143	..	77	17
5.05	140	..	76	16
5.10	137	..	75	16
5.15	134	..	74	16
5.20	131	..	72	16
5.25	128	..	71	16
5.30	126	..	70	15
5.35	123	..	69	15
5.40	121	..	68	15

TABLE OF COMPARATIVE PHYSICAL PROPERTIES

	Notes	Cold Finished Steel	Cold Finished Steel	POTTS JJ —15/25 C. Soft Steel	ELASTUF MEDIA Mach. Steel	ELASTUF PENN Mach. Steel	ELASTUF PENN Mach. Steel	ELASTUF Chrome Nickel	ELASTUF Chrome Nickel H. T.	ELASTUF Chro-Moly H. T.	ELASTUF *3½% Nickel	ELASTUF Type A No. 14 H. T.	ELASTUF Type A No. 9 H T.
Sizes Tested Rounds	1	Up to 1½″	2¾″ & Up	Up to 2″	Up to 2″	Up to 2″	Up to 1½″	Up to 1½″	Up to 2½″	Up to 1½″	Up to 2″	Up to 1⅝″	1¾″-6¼″
Approx. S.A.E. No.	2	1112 or 1120	1112 or 1120	1020	1045	Special	Special	3140	3140	4140	2340	Special	Special
Surface	3	Cold Drawn	Turned and Polished	Hot Rolled	Hot Rolled	Hot Rolled	Cold Finished	Hot Rolled	Hot Rolled	Hot Rolled	Hot Rolled	Hot Rolled	Hot Rolled
Tensile Strength, Lbs. Per Sq. In.	4	70/100,000	50/60,000	55/65,000	80/90,000	100/120,000	100/120,000	100/115,000	125/135,000	130/145,000	90/100,000	125/135,000	140/160,000
Yield Point, Lbs. Per Sq. In.	5	55/90,000	30/40,000	30/40,000	45/50,000	60/70,000	95/110,000	70/80,000	105/115,000	110/125,000	55/65,000	115/125,000	120/135,000
Elong. in 2″, %	6	10/20	20/35	25/35	16/26	15/25	15/25	12/22	16/22	18/22	18/28	18/22	15/20
Red. of Area, %	7	35/55	30/45	45/55	32/42	30/45	35/50	35/45	50/55	50/60	42/52	59/64	42/60
Brinell Hardness (Ave.)	8	143/196	130/170	130/190	170/210	179/217	197/223	207/248	262/320	277/321	170/212	262/321	302/340

NOTES

1. Size tested has an important bearing on physicals; increasing size shows lowered physicals.
2. It should be borne in mind that S.A.E. specifications cover chemical analyses only.
3. Cold Drawing or Cold Rolling improves physicals which improvement decreases with increasing size.
4. Resistance to Fatigue Failure, Shear Strength and Torsional Strength are all proportional to Tensile Strength.
5. Yield Point is the actual working limit of the steel.

6 and 7. Elongation and Reduction of Area are valuable measures of ductility.

8. Hardness figures are not indicative of comparative machinability or wear resistance.

*No figures are shown for 3½% Nickel Steel Heat Treated as this grade is not generally available from stock.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

THE USE OF PHYSICAL PROPERTIES IN SPECIFICATIONS FOR STEEL

Frequently steels are specified by analysis only, without proper regard for physical properties. In many cases the S.A.E. specifications which cover chemical analyses only are used. Physical properties are of greater importance and should be an integral part of any specification covering steels for machine parts.

In machine designing the physical properties must be considered. It is not sufficient to merely give chemical analysis. When shafts or other machine parts fail, it is not because the steel did not contain 1% chromium, or 3½% nickel, or .40 carbon, but because these parts have insufficient physical properties. Therefore the physical properties should be improved.

In deciding on the physicals to be specified it should be borne in mind that Fatigue Resistance, Shear Strength, and Torsional Strength are all proportional to Tensile Strength. The Yield Point is of value because it is truly the working limit of a steel. Elongation and Reduction of Area, which are measures of ductility, are valuable because they indicate the shock and impact resistance of steel.

The American Society for Testing Materials has endorsed specifications that cover both chemical and physical properties. We give below four groups that cover the range of tensile properties from soft steel to the highest quality heat treated alloy steel.

Physical Qualites and A.S.T.M. Specification Numbers for Machinery Steels—together with brand name of corresponding steel carried in stock by HORACE T. POTTS CO.

A.S.T.M. Class	Tensile Strength	Yield Point	Elong. in 2" %	Red. of Area %	Brinell	Available From H.T.P. Co. Stock
A-18-30 Class A	47/60,000#	25/30,000#	25/32	42/53	130/190	POTTS JJ .15/.25 Car. Open Hearth
A-18-30 Class D	75/90,000#	40/50,000#	18/26	24/42	170/210	ELASTUF MEDIA .40/.50 Carbon
See Note Below	100/120,000#	60/70,000#	15/25	30/45	179/217	ELASTUF PENN .35/.45 Car. Spec. Manganese Type
A-96-33 Class C	125/160,000#	105/135,000#	16/22	50/64	260/320	ELASTUF Type A Heat Treated Chrome Vanadium Steel

NOTE: There is, as yet, no A.S.T.M. specification covering this type of steel. This type, however, cannot be left out, for it offers a desirable range of physical properties, filling in the gap between carbon steel and heat treated alloy steel. This grade of steel offers tensile properties in excess of those obtainable with plain carbon steel, or annealed and untreated alloy steel, at the same time having superior machining qualities.

GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

OFFICIAL S.A.E. STEEL SPECIFICATIONS

Revised to January, 1935

CARBON STEELS

S. A. E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulfur Max.
1010	.05– .15	.30– .60	.045	.055
1015	.10– .20	.30– .60	.045	.055
X1015	.10– .20	.70–1.00	.045	.055
1020	.15– .25	.30– .60	.045	.055
X1020	.15– .25	.70–1.00	.045	.055
1025	.20– .30	.30– .60	.045	.055
X1025	.20– .30	.70–1.00	.045	.055
1030	.25– .35	60– .90	.045	.055
1035	.30– .40	.60– .90	.045	.055
1040	.35– .45	.60– .90	.045	.055
X1040	.35– .45	.40– .70	.045	.055
1045	.40– .50	.60– .90	.045	.055
X1045	.40– .50	.40– .70	.045	.055
1050	.45– .55	.60– .90	.045	.055
X1050	.45– .55	.40– .70	.045	.055
1055	.50– .60	.60– .90	.040	.055
X1055	.50– .60	.90–1.20	.040	.055
1060	.55– .70	.60– .90	.040	.055
1065	.60– .75	.60– .90	.040	.055
X1065	.60– .75	.90–1.20	.040	.055
1070	.65– .80	.60– .90	.040	.055
1075	.70– .85	.60– .90	.040	.055
1080	.75– .90	.60– .90	.040	.055
1085	.80– .95	.60– .90	.040	.055
1090	.85–1.00	.60– .90	.040	.055
1095	.90–1.05	.25– .50	.040	.055

FREE CUTTING STEELS

S. A. E. No.	Carbon Range	Mang. Range	Phos. Range	Sulfur Range
1112	.08–.16	.60– .90	.09–.13	.10 –.20
X1112	.08–.16	.60– .90	.09–.13	.20 –.30
1115	.10–.20	.70–1.00	.045 max.	.075–.15
1120	.15–.25	.60– .90	.045 max.	.075–.15
X1314	.10–.20	1.00–1.30	.045 max.	.075–.15
X1315	.10–.20	1.30–1.60	.045 max.	.075–.15
X1330	.25–.35	1.35–1.65	.045 max.	.075–.15
X1335	.30–.40	1.35–1.65	.045 max.	.075–.15
X1340	.35–.45	1.35–1.65	.045 max.	.075–.15

MANGANESE STEELS[1]

S. A. E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulfur Max.
T1330	.25–.35	1.60–1.90	.040	.050
T1335	.30–.40	1.60–1.90	.040	.050
T1340	.35–.45	1.60–1.90	.040	.050
T1345	.40–.50	1.60–1.90	.040	.050
T1350	.45–.55	1.60–1.90	.040	.050

[1]Silicon range of all S.A.E. basic open hearth alloy steels shall be 0.15–0.30. For electric and acid open hearth alloy steels, the silicon content shall be 0.15 min.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

OFFICIAL S.A.E. STEEL SPECIFICATIONS

Revised to January, 1935

NICKEL STEELS[1]

S. A. E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulfur Max.	Nickel Range
2015	.10-.20	.30-.60	.040	.050	.40- .60
2115	.10-.20	.30-.60	.040	.050	1.25-1.75
2315	.10-.20	.30-.60	.040	.050	3.25-3.75
2320	.15-.25	.30-.60	.040	.050	3.25-3.75
2330	.25-.35	.50-.80	.040	.050	3.25-3.75
2335	.30-.40	.50-.80	.040	.050	3.25-3.75
2340	.35-.45	.60-.90	.040	.050	3.25-3.75
2345	.40-.50	.60-.90	.040	.050	3.25-3.75
2350	.45-.55	.60-.90	.040	.050	3.25-3.75
2515	.10-.20	.30-.60	.040	.050	4.75-5.25

NICKEL CHROMIUM STEELS[1]

S. A. E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulfur Max.	Nickel Range	Chromium Range
3115	.10-.20	.30-.60	.040	.050	1.00-1.50	.45- .75
3120	.15-.25	.30-.60	.040	.050	1.00-1.50	.45- .75
3125	.20-.30	.50-.80	.040	.050	1.00-1.50	.45- .75
3130	.25-.35	.50-.80	.040	.050	1.00-1.50	.45- .75
3135	.30-.40	.50-.80	.040	.050	1.00-1.50	.45- .75
3140	.35-.45	.60-.90	.040	.050	1.00-1.50	.45- .75
X3140	.35-.45	.60-.90	.040	.050	1.00-1.50	.60- .90
3145	.40-.50	.60-.90	.040	.050	1.00-1.50	.45- .75
3150	.45-.55	.60-.90	.040	.050	1.00-1.50	.45- .75
3215	.10-.20	.30-.60	.040	.050	1.50-2.00	.90-1.25
3220	.15-.25	.30-.60	.040	.050	1.50-2.00	.90-1.25
3230	.25-.35	.30-.60	.040	.050	1.50-2.00	.90-1.25
3240	.35-.45	.30-.60	.040	.050	1.50-2.00	.90-1.25
3245	.40-.50	.30-.60	.040	.050	1.50-2.00	.90-1.25
3250	.45-.55	.30-.60	.040	.050	1.50-2.00	.90-1.25
3312	max. 0.17	.30-.60	.040	.050	3.25-3.75	1.25-1.75
3325	.20-.30	.30-.60	.040	.050	3.25-3.75	1.25-1.75
3335	.30-.40	.30-.60	.040	.050	3.25-3.75	1.25-1.75
3340	.35-.45	.30-.60	.040	.050	3.25-3.75	1.25-1.75
3415	.10-.20	.30-.60	.040	.050	2.75-3.25	.60- .95
3435	.30-.40	.30-.60	.040	.050	2.75-3.25	.60- .95
3450	.45-.55	.30-.60	.040	.050	2.75-3.25	.60- .95

MOLYBDENUM STEELS[1]

S. A. E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulfur Max.	Chrom. Range	Nickel Range	Moly. Range
4130	.25-.35	.50-.80	.040	.050	.50- .80	.....	.15-.25
X4130	.25-.35	.40-.60	.040	.050	.80-1.10	.....	.15-.25
4135	.30-.40	.60-.90	.040	.050	.80-1.10	.....	.15-.25
4140	.35-.45	.60-.90	.040	.050	.80-1.10	.....	.15-.25
4150	.45-.55	.60-.90	.040	.050	.80-1.10	.....	.15-.25
4340	.35-.45	.50-.80	.040	.050	.50- .80	1.50-2.00	.30-.40
4345	.40-.50	.50-.80	.040	.050	.60- .90	1.50-2.00	.15-.25
4615	.10-.20	.40-.70	.040	.050	.....	1.65-2.00	.20-.30
4620	.15-.25	.40-.70	.040	.050	.....	1.65-2.00	.20-.30
4640	.35-.45	.50-.80	.040	.050	.....	1.65-2.00	.20-.30
4815	.10-.20	.40-.60	.040	.050	.....	3.25-3.75	.20-.30
4820	.15-.25	.40-.60	.040	.050	.....	3.25-3.75	.20-.30

[1]Silicon range of all S.A.E. basic open hearth alloy steels shall be 0.15–0.30. For electric and acid open hearth alloy steels, the silicon content shall be 0.15 min.

GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

OFFICIAL S.A.E. STEEL SPECIFICATIONS

Revised to January, 1935

CHROMIUM STEELS[1]

S. A. E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulfur Max.	Chromium Range
5120	.15– .25	.30–.60	.040	.050	.60– .90
5140	.35– .45	.60–.90	.040	.050	.80–1.10
5150	.45– .55	.60–.90	.040	.050	.80–1.10
52100	.95–1.10	.20–.50	.030	.035	1.20–1.50

CHROMIUM VANADIUM STEELS[1]

S. A. E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulfur Max.	Chrom. Range	Vanadium	
						Min.	Desired
6115	.10– .20	.30–.60	.040	.050	.80–1 10	.15	.18
6120	.15– .25	.30–.60	.040	.050	.80–1.10	.15	.18
6125	.20– 30	.60–.90	.040	.050	.80–1.10	.15	.18
6130	.25– 35	.60–.90	.040	.050	.80–1.10	.15	.18
6135	.30– .40	.60–.90	.040	.050	.80–1.10	.15	.18
6140	.35– .45	.60–.90	.040	.050	.80–1.10	.15	.18
6145	.40– 50	.60–.90	.040	.050	.80–1.10	.15	.18
6150	.45– .55	.60–.90	.040	.050	.80–1.10	.15	.18
6195	.90–1.05	.20–.45	.030	.035	.80–1.10	.15	.18

TUNGSTEN STEELS[1]

S. A. E. No.	Carbon Range	Mang. Max.	Phos. Max.	Sulfur Max.	Chromium Range	Tungsten Range
71360	.50–.70	.30	035	.040	3.00–4.00	12.00–15.00
71660	.50–.70	.30	.035	.040	3.00–4.00	15.00–18.00
7260	.50–.70	.30	.035	.040	.50–1.00	1.50– 2.00

SILICON MANGANESE STEELS

S. A. E. No.	Carbon Range	Mang. Range	Phos. Max.	Sulfur Max.	Silicon Range
9255	.50–.60	.60–.90	.040	.050	1.80–2.20
9260	.55–.65	.60–.90	.040	.050	1.80–2.20

CORROSION AND HEAT-RESISTING ALLOYS

S. A. E. No.	Carbon Max.	Mang. Max.	Phos. Max.	Sulfur Max.	Silicon Max.	Chromium Range	Nickel Range
30905	.08	.20–.70	.030	.030	.75	17.00–20.00	8.00–10.00
30915	.09–.20	.20–.70	.030	.030	.75	17.00–20.00	8.00–10 00
51210	.12	.60	.030	.030	.50	11.50–13.00	.....
X51410	.12	.60	.030	.15–.50	.50	13.00–15.00	.....
51335	.25–.40	.60	.030	.030	.50	12.00–14 00	.....
51510	.12	.60	.030	.030	.50	14.00–16.00	.....
51710	.12	.60	.030	.030	.50	16.00–18.00	.....

[1]Silicon range of all S.A.E. basic open hearth alloy steels shall be 0.15–0.30. For electric and acid open hearth alloy steels, the silicon content shall be 0.15 min.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

EXPLANATION OF THE S.A.E. NUMBERING SYSTEM

The numerical index system, commonly referred to as the S.A.E. Standard System, was developed by the Society of Automotive Engineers, Inc., to provide a simple means of indicating the chemical composition of the various steel grades in more common use. The present revision has been brought about by the development and general application of numerous new steel analyses during recent years and the necessity for extending the system to cover them.

The system is based on the use of numbers composed of four or five digits, and certain letters used as prefixes. The first digit of the standard number indicates the type to which the particular steel belongs. Thus "1" indicates a carbon steel, "2" a nickel steel, "3" a nickel-chromium steel, "4" a molybdenum steel, etc. In the case of the alloy steels, the second digit, and sometimes the third, usually indicates the approximate percentage of the principal alloy—in the case of simple alloys, the alloy from which the steel is named. The final two (sometimes three) digits indicate the mean carbon content in "points," or one-hundredths of one percent. Thus, "2320" indicates a nickel steel of approximately 3% nickel content (3.25%/3.75%) and .20% average carbon (.15%/.25%); "52100" indicates a chromium steel of more than 1% average chromium content (1.20%/1.50%, as compared with .60%/.90% or .80%/1.10% for the 5100 series) and 1.00% carbon (.95%/1.10%), while "71360" indicates a tungsten steel of 13% tungsten content (12%/15%) and .60% carbon (.50%/.70%).

The prefix "X" is used in several instances to indicate variations in the range of sulphur, manganese and chromium, and the prefix "T" is used with Manganese Steels to indicate a higher range of manganese than that found in steels of the X1300 series.

Basic numerals of the system are:

CARBON STEELS First digit—1

Plain Carbon	10 . .
Free Cutting (Screw Stock)	11 . .
Free Cutting (Manganese)	X13 . .
High Manganese	T13 . .

ALLOY STEELS

Nickel First Digit—2

.50% Nickel	20 . .
1.50% Nickel	21 . .
3.50% Nickel	23 . .
5.00% Nickel	23 . .

Nickel-Chromium First Digit—3

1.25% Nickel, .60% Chromium	31 . .
1.75% Nickel, 1.00% Chromium	32 . .
3.50% Nickel, 1.50% Chromium	33 . .
3.00% Nickel, .80% Chromium	34 . .
Corrosion and Heat-Resisting (Stainless)	30 . . .

Molybdenum First Digit—4

Chromium-Molybdenum	41 . .
Chromium-Nickel-Molybdenum	43 . .
Nickel-Molybdenum	46 . .
and	48 . .

Chromium First Digit—5

Low Chromium (up to 1.10%)	51 . .
Medium Chromium	52 . . .
Corrosion and Heat-Resisting (Stainless)	51 . . .

Chromium-Vanadium (.80%/1.10% Chromium)	61 . .
Tungsten	7 . . .
and	71 . . .
Silico-Manganese	9 . . .

GAUGES AND WEIGHTS
Extras for Size and Quantity
CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

STANDARD GAUGES
EQUIVALENTS IN DECIMALS OF AN INCH

Number of Gauge	Thickness in Decimals of an Inch						
	Birmingham or Stubs Iron Wire	Brown & Sharpe	United States Standard Plate Iron and Steel	British Imperial	* Washburn & Moen Mfg. Co.	Trenton Iron Co.	Drill Rod or Stubs Steel Wire
7–0's	.....	.....	.500	.500	.....	.....	.....
6–0's	.....	.580	.46875	.464	.....	.....	.....
5–0's	.....	.5165	.4375	.432	.....	.45	.....
4–0's	.454	.46	.40625	.400	.3938	.40	.....
3–0's	.425	.40964	.375	.372	.3625	.36	.....
2–0's	.380	.3648	.34375	.348	.3310	.33	.....
0	.340	.32486	.3125	.324	.3065	.305	.....
1	.300	.2893	.28125	.300	.2830	.285	.227
2	.284	.25763	.265625	.276	.2625	.265	.219
3	.259	.22942	.25	.252	.2437	.245	.212
4	.238	.20431	.234375	.232	.2253	.225	.207
5	.220	.18194	.21875	.212	.2070	.205	.204
6	.203	.16202	.203125	.192	.1920	.190	.201
7	.180	.14428	.1875	.176	.1770	.175	.199
8	.165	.12849	.171875	.160	.1620	.160	.197
9	.148	.11443	.15625	.144	.1483	.145	.194
10	.134	.10189	.140625	.128	.1350	.130	.191
11	.120	.090742	.125	.116	.1205	.1175	.188
12	.109	.080808	.109375	.104	.1055	.1050	.185
13	.095	.071961	.09375	.092	.0915	.0925	.182
14	.083	.064084	.078125	.080	.0800	.0800	.180
15	.072	.057068	.0703125	.072	.0720	.0700	.178
16	.065	.05082	.0625	.064	.0625	.0610	.175
17	.058	.045257	.05625	.056	.0540	.0525	.172
18	.049	.040303	.05	.048	.0475	.0450	.168
19	.042	.03589	.04375	.040	.0410	.0400	.164
20	.035	.031961	.0375	.036	.0348	.0350	.161
21	.032	.028462	.034375	.032	.03175	.0310	.157
22	.028	.025347	.03125	.028	.0286	.0280	.155
23	.025	.022571	.028125	.024	.0258	.0250	.153
24	.022	.0201	.025	.022	.0230	.0225	.151
25	.020	.0179	.021875	.020	.0204	.0200	.148
26	.018	.01594	.01875	.018	.0181	.0180	.146
27	.016	.014195	.0171875	.0164	.0173	.0170	.143
28	.014	.012641	.015625	.0148	.0162	.0160	.139
29	.013	.011257	.0140625	.0136	.0150	.0150	.134
30	.012	.010025	.0125	.0124	.0140	.0140	.127
31	.010	.008928	.0109375	.0116	.0132	.0130	.120
32	.009	.00795	.01015625	.0108	.0128	.0120	.115
33	.008	.00708	.009375	.0100	.0118	.0110	.112
34	.007	.006304	.00859375	.0092	.0104	.0100	.110
35	.005	.005614	.0078125	.0084	.0095	.0095	.108
36	.004	.005	.00703125	.0076	.0090	.0090	.106
37	.....	.004453	.006640625	.0068	.....	.0085	.103
38	.....	.003965	.00625	.0060	.....	.0080	.101
39	.....	.003531	.....	.....	.....	.0075	.099
40	.....	.003144	.....	.....	.....	.0070	.097

*Also Jones & Laughlin, John A. Roebling's Sons and American Steel & Wire Co., Wire Gauge.

Quick Service

Philadelphia
REGent 7456
Park 5351

Baltimore
Vernon 8266

UNITED STATES STANDARD WEIGHT OF GAUGES

FOR STEEL PLATES AND SHEETS

U. S. Standard Gauge

No. of Gauge	Thickness in Inches		Weight Square Foot	
	Fractions	Decimals	Iron	Steel
7-0's	1/2	.5	20.00	20.4
6-0's	15/32	.46875	18.75	19.125
5-0's	7/16	.4375	17.50	17.85
0000	13/32	.40625	16.25	16.575
000	3/8	.375	15.	15.30
00	11/32	.34375	13.75	14.025
0	5/16	.3125	12.50	12.75
1	9/32	.28125	11.25	11.475
2	17/64	.265625	10.625	10.8375
3	1/4	.25	10.	10.2
4	15/64	.234375	9.375	9.5625
5	7/32	.21875	8.75	8.925
6	13/64	.203125	8.125	8.2875
7	3/16	.1875	7.5	7.65
8	11/64	.171875	6.875	7.0125
9	5/32	.15625	6.25	6.375
10	9/64	.140625	5.625	5.7375
11	1/8	.125	5.	5.1
12	7/64	.109375	4.375	4.4625
13	3/32	.09375	3.75	3.825
14	5/64	.078125	3.125	3.1875
15	9/128	.0703125	2.8125	2.86875
16	1/16	.0625	2.5	2.55
17	9/160	.05625	2.25	2.295
18	1/20	.05	2.	2.04
19	7/160	.04375	1.75	1.785
20	3/80	.0375	1.50	1.53
21	11/320	.034375	1.375	1.4025
22	1/32	.03125	1.25	1.275
23	9/320	.028125	1.125	1.1475
24	1/40	.025	1.	1.02
25	7/320	.021875	.875	.8925
26	3/160	.01875	.75	.765
27	11/640	.0171875	.6875	.70125
28	1/64	.015625	.625	.6375
29	9/640	.0140625	.5625	.57375
30	1/80	.0125	.5	.51
31	7/640	.010985	.4375	.44625
32	13/1280	.01045625	.40625	.414375
33	3/320	.009375	.375	.3825
34	11/1280	.00859375	.34375	.350625
35	5/640	.0078125	.3125	.31875
36	9/1280	.00703125	.28125	.286875
37	17/2560	.00664062	.265625	.2709375
38	1/160	.00625	.25	.255

Sheet mills roll iron and steel sheets to U. S. Standard Gauge unless otherwise ordered. Plate mills usually roll heavy plates 3/16″ and heavier, and light plates No. 8 to No. 12 to Birmingham Gauge.

The low temperature (as compared with iron) at which steel plates have to be finished, causes a slight springing of the rolls, leaving the plate thicker in the center than on the edge. This is especially noticeable in plates less than 3/8″ thick and over 66″ wide, which may be of full thickness on the edge and yet be as much as 1/8″ thicker in the middle.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

FRACTIONS OF AN INCH IN EQUIVALENT DECIMALS

FOR USE IN CONNECTION WITH MICROMETER CALIPERS

Fractions of an Inch		Decimals of an Inch	Fractions of an Inch		Decimals of an Inch
1/64	=	.015625	33/64	=	.515625
1/32	=	.03125	17/32	=	.53125
3/64	=	.046875	35/64	=	.546875
1/16	=	.0625	9/16	=	.5625
5/64	=	.078125	37/64	=	.578125
3/32	=	.09375	19/32	=	.59375
7/64	=	.109375	39/64	=	.609375
1/8	=	.125	5/8	=	.625
9/64	=	.140625	41/64	=	.640625
5/32	=	.15625	21/32	=	.65625
11/64	=	.171875	43/64	=	.671875
3/16	=	.1875	11/16	=	.6875
13/64	=	.203125	45/64	=	.703125
7/32	=	.21875	23/32	=	.71875
15/64	=	.234375	47/64	=	.734375
1/4	=	.25	3/4	=	.75
17/64	=	.265625	49/64	=	.765625
9/32	=	.28125	25/32	=	.78125
19/64	=	.296875	51/64	=	.796875
5/16	=	.3125	13/16	=	.8125
21/64	=	.328125	53/64	=	.828125
11/32	=	.34375	27/32	=	.84375
23/64	=	.359375	55/64	=	.859375
3/8	=	.375	7/8	=	.875
25/64	=	.390625	57/64	=	.890625
13/32	=	.40625	29/32	=	.90625
27/64	=	.421875	59/64	=	.921875
7/16	=	.4375	15/16	=	.9375
29/64	=	.453125	61/64	=	.953125
15/32	=	.46875	31/32	=	.96875
31/64	=	.484375	63/64	=	.984375
1/2	=	.5			

APPROXIMATE WEIGHTS OF VARIOUS METALS

To find the weight of various metals, multiply the contents in cubic inches by the number shown below; the result will be the approximate weight in pounds.

Iron.....	.27777	Brass....	.3112	Tin.....	.26562
Steel....	.28333	Lead....	.41015	Aluminum	.09375
Copper..	.32118	Zinc.....	.25318		

Steel Bars—*Flats and Squares.* To find the approximate weight per lineal foot of bar, multiply width times thickness times 10 and divide by 3. Example: (½ in. x 6 in. flat): ½ x 6 x 10 divided by 3 gives 10 lbs. per foot. (Actual is 10.2 lbs.)

Rounds. To find the approximate weight per lineal foot of bar, multiply the diameter times the diameter times 8 and divide by 3. Example: (2 in. round): 2 x 2 x 8 divided by 3 gives 10.67 lbs. per ft. (Actual is 10.68 lbs.)

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

DECIMALS OF A FOOT EQUIVALENT TO INCHES AND FRACTIONS OF AN INCH

INCH	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″	10″	11″
0	0	.0833	.1667	.2500	.3333	.4166	.5000	.5833	.6667	.7500	.8333	.9166
1/16	.0052	.0885	.1719	.2552	.3385	.4219	.5052	.5885	.6719	.7552	.8385	.9218
1/8	.0104	.0937	.1771	.2604	.3437	.4271	.5104	.5937	.6771	.7604	.8437	.9270
3/16	.0156	.0990	.1823	.2656	.3489	.4323	.5156	.5989	.6823	.7656	.8489	.9322
1/4	.0208	.1042	.1875	.2708	.3541	.4375	.5208	.6041	.6875	.7708	.8541	.9374
5/16	.0260	.1094	.1927	.2760	.3594	.4427	.5260	.6093	.6927	.7760	.8593	.9426
3/8	.0312	.1146	.1979	.2812	.3646	.4479	.5312	.6145	.6979	.7812	.8645	.9479
7/16	.0365	.1198	.2031	.2864	.3698	.4531	.5364	.6198	.7031	.7864	.8697	.9531
1/2	.0417	.1250	.2083	.2916	.3750	.4583	.5416	.6250	.7083	.7916	.8749	.9583
9/16	.0469	.1302	.2135	.2969	.3802	.4635	.5468	.6302	.7135	.7968	.8802	.9635
5/8	.0521	.1354	.2187	.3021	.3854	.4687	.5520	.6354	.7187	.8020	.8854	.9687
11/16	.0573	.1406	.2239	.3073	.3906	.4739	.5573	.6406	.7239	.8072	.8906	.9739
3/4	.0625	.1458	.2292	.3125	.3958	.4791	.5625	.6458	.7291	.8124	.8958	.9791
13/16	.0677	.1510	.2344	.3177	.4010	.4843	.5677	.6510	.7343	.8177	.9010	.9843
7/8	.0729	.1562	.2396	.3229	.4062	.4896	.5729	.6562	.7395	.8229	.9062	.9895
15/16	.0781	.1614	.2448	.3281	.4114	.4948	.5781	.6614	.7447	.8281	.9114	.9947

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

WEIGHT PER FOOT
BAR STEEL
ROUNDS AND SQUARES

Size in Inches	ROUNDS Lbs. Per Ft.	SQUARES Lbs. Per Ft.	Size in Inches	ROUNDS Lbs. Per Ft.	SQUARES Lbs. Per Ft.
1/16	.0104	.013	4 5/8	57.12	72.73
1/8	.042	.05	4 3/4	60.25	76.71
3/16	.094	.119	4 7/8	63.46	80.81
1/4	.167	.212	5	66.76	85.00
5/16	.261	.333	5 1/8	70.14	89.30
3/8	.375	.478	5 1/4	73.60	93.72
7/16	.511	.651	5 3/8	77.15	98.23
1/2	.667	.850	5 1/2	80.77	102.80
9/16	.845	1.076	5 5/8	84.49	107.60
5/8	1.043	1.328	5 3/4	88.29	112.40
11/16	1.262	1.608	5 7/8	92.17	117.40
3/4	1.502	1.913	6	96.14	122.40
13/16	1.763	2.245	6 1/8	100.20	127.60
7/8	2.044	2.603	6 1/4	104.30	132.80
15/16	2.347	2.989	6 3/8	108.50	138.20
1	2.670	3.400	6 1/2	112.80	143.60
1 1/16	3.014	3.838	6 5/8	117.20	149.20
1 1/8	3.379	4.303	6 3/4	121.70	154.90
1 3/16	3.766	4.795	6 7/8	126.20	160.80
1 1/4	4.173	5.312	7	130.90	166.60
1 5/16	4.600	5.857	7 1/8	135.60	172.60
1 3/8	5.049	6.428	7 1/4	140.40	178.70
1 7/16	5.518	7.026	7 3/8	145.30	184.90
1 1/2	6.008	7.650	7 1/2	150.20	191.30
1 9/16	6.520	8.301	7 5/8	155.20	197.70
1 5/8	7.051	8.978	7 3/4	160.30	204.20
1 11/16	7.604	9.682	7 7/8	165.60	210.80
1 3/4	8.178	10.41	8	171.00	217.60
1 13/16	8.773	11.17	8 1/8	176.30	224.50
1 7/8	9.388	11.95	8 1/4	181.80	231.40
1 15/16	10.02	12.76	8 3/8	187.30	238.50
2	10.68	13.60	8 1/2	193.00	245.60
2 1/16	11.36	14.46	8 5/8	198.70	252.90
2 1/8	12.06	15.35	8 3/4	204.40	260.30
2 3/16	12.78	16.27	8 7/8	210.30	267.90
2 1/4	13.52	17.22	9	216.30	275.40
2 5/16	14.28	18.19	9 1/8	224.40	283.20
2 3/8	15.07	19.18	9 1/4	228.50	290.90
2 7/16	15.86	20.20	9 3/8	234.70	298.90
2 1/2	16.69	21.25	9 1/2	241.00	306.80
2 9/16	17.53	22.33	9 5/8	247.40	315.00
2 5/8	18.40	23.43	9 3/4	253.90	323.20
2 11/16	19.29	24.56	9 7/8	260.40	331.60
2 3/4	20.20	25.71	10	267.00	340.00
2 13/16	21.12	26.90	10 1/8	273.80	348.50
2 7/8	22.07	28.10	10 1/4	280.60	357.20
2 15/16	23.04	29.34	10 3/8	287.40	366.00
3	24.03	30.60	10 1/2	294.40	374.90
3 1/8	26.08	33.20	10 5/8	301.40	383.80
3 1/4	28.20	35.92	10 3/4	308.60	392.90
3 3/8	30.42	38.73	10 7/8	315.80	402.10
3 1/2	32.71	41.65	11	323.10	411.40
3 5/8	35.09	44.68	11 1/8	330.50	420.90
3 3/4	37.56	47.82	11 1/4	337.90	430.30
3 7/8	40.10	51.05	11 3/8	345.50	439.90
4	42.73	54.40	11 1/2	353.10	449.60
4 1/8	45.44	57.85	11 5/8	360.90	459.50
4 1/4	48.24	61.41	11 3/4	368.60	469.40
4 3/8	51.11	65.08	11 7/8	376.60	479.50
4 1/2	54.07	68.85	12	384.50	489.60

Weight of High Speed Steel, add 10% to the above weight.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

WEIGHT PER FOOT

BAR STEEL

OCTAGON AND HEXAGON

Size Inches	Octagon	Hexagon
1/32	.0027	.0029
1/16	.011	.0115
1/8	.044	.046
3/16	.10	.10
1/4	.18	.195
5/16	.28	.29
3/8	.40	.43
7/16	.54	.56
1/2	.70	.73
9/16	.89	.93
5/8	1.10	1.15
11/16	1.33	1.40
3/4	1.58	1.66
13/16	1.83	1.91
7/8	2.16	2.25
15/16	2.48	2.58
1	2.82	2.94
1 1/16	3.17	3.30
1 1/8	3.56	3.73
1 3/16	3.98	4.15
1 1/4	4.40	4.60
1 5/16	4.85	5.07
1 3/8	5.32	5.57
1 7/16	5.82	6.09
1 1/2	6.34	6.64
1 9/16	6.88	7.19
1 5/8	7.32	7.78
1 11/16	8.02	8.38
1 3/4	8.64	9.02
1 13/16	9.25	9.67
1 7/8	9.92	10.32
1 15/16	10.57	11.05
2	11.28	11.78
2 1/16	11.98	12.53
2 1/8	12.71	13.30
2 3/16	13.48	14.09
2 1/4	14.24	14.91
2 5/16	15.06	15.75
2 3/8	15.88	16.61
2 7/16	16.73	17.49
2 1/2	17.65	18.40
2 9/16	18.49	19.33
2 5/8	19.45	20.29
2 11/16	20.35	21.27
2 3/4	21.28	22.27
2 13/16	22.28	23.29
2 7/8	23.28	24.33
2 15/16	24.30	25.40
3	25.36	26.43

The above table will apply to Tool Steel, as well as to Machinery Steel.

Weight of High Speed Steel, add 10% to the above weights.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

*WEIGHT PER LINEAL FOOT FLAT ROLLED STEEL

Thickness Inches	WIDTH—INCHES								
	½	⅝	¾	⅞	1	1⅛	1¼	1⅜	1½
1/16	.1060	.1381	.1594	.1859	.212	.2391	.2656	.292	.319
⅛	.2125	.2656	.3188	.3720	.4250	.4782	.5312	.585	.638
3/16	.319	.399	.478	.558	.638	.717	.797	.875	.957
¼	.425	.531	.636	.743	.850	.957	1.06	1.17	1.28
5/16	.531	.664	.797	.929	1.06	1.20	1.33	1.46	1.59
⅜	.638	.797	.957	1.116	1.28	1.43	1.59	1.76	1.92
7/16	.744	.929	1.116	1.302	1.49	1.68	1.86	2.05	2.23
½	.850	1.06	1.275	1.487	1.70	1.92	2.12	2.34	2.55
9/16	.957	1.20	1.434	1.674	1.92	2.15	2.39	2.63	2.87
⅝	1.06	1.33	1.594	1.859	2.12	2.39	2.65	2.92	3.19
11/16	1.17	1.46	1.753	2.045	2.34	2.63	2.92	3.22	3.51
¾	1.28	1.60	1.913	2.232	2.55	2.87	3.19	3.51	3.83
13/16	1.38	1.73	2.072	2.417	2.76	3.11	3.45	3.80	4.14
⅞	1.49	1.86	2.232	2.604	2.98	3.35	3.72	4.09	4.47
15/16	1.60	1.99	2.391	2.789	3.19	3.59	3.99	4.39	4.78
1	1.70	2.13	2.55	2.98	3.40	3.83	4.25	4.68	5.10
1 1/16	1.81	2.26	2.710	3.161	3.61	4.064	4.52	4.97	5.42
1⅛	1.91	2.39	2.868	3.347	3.83	4.304	4.78	5.26	5.74
1 3/16	2.02	2.52	3.03	3.533	4.04	4.54	5.05	5.56	6.06
1¼	2.12	2.66	3.19	3.72	4.25	4.79	5.31	5.85	6.38
1 5/16	2.23	2.79	3.35	3.91	4.46	5.02	5.58	6.14	6.69
1⅜	2.34	2.92	3.51	4.09	4.67	5.26	5.84	6.43	7.02
1 7/16	2.45	3.06	3.67	4.28	4.89	5.50	6.11	6.72	7.34
1½	2.55	3.19	3.83	4.47	5.10	5.74	6.38	7.02	7.65
1 9/16	2.66	3.32	3.99	4.65	5.32	5.98	6.64	7.31	7.97
1⅝	2.76	3.45	4.15	4.84	5.52	6.22	6.90	7.60	8.29
1 11/16	2.87	3.59	4.31	5.02	5.74	6.46	7.17	7.89	8.61
1¾	2.98	3.72	4.47	5.21	5.95	6.70	7.44	8.19	8.93
1 13/16	3.08	3.85	4.62	5.466	6.16	6.93	7.70	8.48	9.24
1⅞	3.19	3.99	4.79	5.58	6.38	7.17	7.97	8.77	9.57
1 15/16	3.30	4.12	4.94	5.77	6.59	7.42	8.24	9.06	9.88
2	3.40	4.25	5.10	5.95	6.80	7.65	8.50	9.35	10.20

*These figures are the theoretical weights, based on 489.6 lbs. per cubic foot of steel. Iron will run about 2% lighter.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

*WEIGHT PER LINEAL FOOT FLAT ROLLED STEEL

(CONTINUED)

Thickness Inches	WIDTH—INCHES								
	1⅝	1¾	2	2¼	2½	2¾	3	3¼	3½
1/16	.346	.372	.425	.478	.531	.584	.638	.691	.744
⅛	.692	.744	.850	.96	1.06	1.17	1.28	1.38	1.49
3/16	1.04	1.15	1.28	1.44	1.59	1.75	1.91	2.07	2.23
¼	1.38	1.49	1.70	1.92	2.12	2.34	2.55	2.76	2.98
5/16	1.73	1.86	2.12	2.39	2.65	2.92	3.19	3.45	3.72
⅜	2.08	2.23	2.55	2.87	3.19	3.51	3.83	4.15	4.47
7/16	2.42	2.60	2.98	3.35	3.72	4.09	4.46	4.83	5.20
½	2.72	2.98	3.40	3.83	4.25	4.67	5.10	5.53	5.95
9/16	3.11	3.35	3.83	4.30	4.78	5.26	5.74	6.22	6.70
⅝	3.46	3.72	4.25	4.78	5.31	5.84	6.38	6.91	7.44
11/16	3.80	4.09	4.67	5.26	5.84	6.43	7.02	7.60	8.18
¾	4.15	4.47	5.10	5.75	6.38	7.02	7.65	8.29	8.93
13/16	4.49	4.84	5.53	6.21	6.90	7.60	8.29	8.98	9.67
⅞	4.84	5.20	5.95	6.69	7.44	8.18	8.93	9.67	10.41
15/16	5.18	5.58	6.38	7.18	7.97	8.77	9.57	10.36	11.16
1	5.53	5.95	6.80	7.65	8.50	9.35	10.20	11.05	11.90
1 1/16	5.87	6.32	7.22	8.13	9.03	9.93	10.84	11.74	12.65
1⅛	6.22	6.70	7.65	8.61	9.57	10.52	11.48	12.43	13.39
1 3/16	6.56	7.07	8.08	9.09	10.10	11.11	12.12	13.12	14.13
1¼	6.91	7.44	8.50	9.57	10.63	11.69	12.75	13.81	14.87
1 5/16	7.25	7.81	8.93	10.04	11.16	12.27	13.39	14.50	15.62
1⅜	7.60	8.18	9.35	10.52	11.69	12.85	14.03	15.20	16.36
1 7/16	7.94	8.56	9.78	11.00	12.22	13.44	14.66	15.88	17.10
1½	8.29	8.93	10.20	11.48	12.75	14.03	15.30	16.58	17.85
1 9/16	8.74	9.30	10.63	11.95	13.28	14.61	15.94	17.27	18.60
1⅝	8.98	9.67	11.05	12.43	13.81	15.19	16.58	17.96	19.34
1 11/16	9.33	10.04	11.47	12.91	14.34	15.78	17.22	18.65	20.08
1¾	9.67	10.42	11.90	13.40	14.88	16.37	17.85	19.34	20.83
1 13/16	10.02	10.79	12.33	13.86	15.40	16.95	18.49	20.03	21.57
1⅞	10.36	11.15	12.75	14.34	15.94	17.53	19.13	20.72	22.31
1 15/16	10.71	11.53	13.18	14.83	16.47	18.12	19.77	21.41	23.06
2	11.05	11.90	13.60	15.30	17.00	18.70	20.40	22.10	23.80

(Continued on next page)

*These figures are the theoretical weights, based on 489.6 lbs. per cubic foot of steel. Iron will run about 2% lighter.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

*WEIGHT PER LINEAL FOOT FLAT ROLLED STEEL

(CONTINUED)

Thickness Inches	WIDTH—INCHES								
	3¾	4	4¼	4½	4¾	5	5¼	5½	5¾
1/16	.80	.85	.90	.96	1.01	1.06	1.116	1.169	1.222
1/8	1.59	1.70	1.81	1.91	2.02	2.13	2.232	2.338	2.444
3/16	2.39	2.55	2.71	2.87	3.03	3.19	3.35	3.51	3.67
1/4	3.19	3.40	3.61	3.83	4.04	4.25	4.46	4.67	4.89
5/16	3.99	4.25	4.52	4.78	5.05	5.31	5.58	5.84	6.11
3/8	4.78	5.10	5.42	5.74	6.06	6.38	6.69	7.02	7.34
7/16	5.58	5.95	6.32	6.70	7.07	7.44	7.81	8.18	8.56
1/2	6.38	6.80	7.22	7.65	8.08	8.50	8.93	9.35	9.77
9/16	7.17	7.65	8.13	8.61	9.09	9.57	10.04	10.52	11.00
5/8	7.97	8.50	9.03	9.57	10.10	10.63	11.16	11.69	12.22
11/16	8.76	9.35	9.93	10.52	11.11	11.69	12.27	12.85	13.44
3/4	9.57	10.20	10.84	11.48	12.12	12.75	13.39	14.03	14.67
13/16	10.36	11.05	11.74	12.43	13.12	13.81	14.50	15.19	15.88
7/8	11.16	11.90	12.65	13.39	14.13	14.87	15.62	16.36	17.10
15/16	11.95	12.75	13.55	14.34	15.14	15.94	16.74	17.53	18.33
1	12.75	13.60	14.45	15.30	16.15	17.00	17.85	18.70	19.55
1 1/16	13.55	14.45	15.35	16.26	17.16	18.06	18.96	19.87	20.77
1 1/8	14.34	15.30	16.26	17.22	18.17	19.13	20.08	21.04	21.99
1 3/16	15.14	16.15	17.16	18.17	19.18	20.19	21.20	22.21	23.22
1 1/4	15.94	17.00	18.06	19.13	20.19	21.25	22.32	23.38	24.44
1 5/16	16.74	17.85	18.96	20.08	21.20	22.32	23.43	24.54	25.66
1 3/8	17.53	18.70	19.87	21.04	22.21	23.38	24.54	25.71	26.88
1 7/16	18.33	19.55	20.77	21.99	23.22	24.44	25.66	26.88	28.10
1 1/2	19.13	20.40	21.68	22.95	24.23	25.50	26.78	28.05	29.33
1 9/16	19.92	21.25	22.58	23.91	25.24	26.57	27.89	29.22	30.55
1 5/8	20.72	22.10	23.48	24.87	26.25	27.63	29.01	30.39	31.77
1 11/16	21.51	22.95	24.38	25.82	27.26	28.69	30.12	31.55	32.99
1 3/4	22.32	23.80	25.29	26.78	28.27	29.75	31.24	32.73	34.22
1 13/16	23.11	24.65	26.19	27.73	29.27	30.81	32.35	33.89	35.43
1 7/8	23.91	25.50	27.10	28.69	30.28	31.87	33.47	35.06	36.65
1 15/16	24.70	26.35	28.00	29.64	31.29	32.94	34.59	36.23	37.88
2	25.50	27.20	28.90	30.60	32.30	34.00	35.70	37.40	39.10

*These figures are the theoretical weights, based on 489.6 lbs. per cubic foot of steel. Iron will run about 2% lighter.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

*WEIGHT PER LINEAL FOOT FLAT ROLLED STEEL

(CONTINUED)

Thickness Inches	WIDTH—INCHES								
	6	6¼	6½	6¾	7	7¼	7½	7¾	8
1/16	1.275	1.328	1.381	1.434	1.487	1.540	1.594	1.647	1.70
1/8	2.550	2.656	2.762	2.869	2.975	3.081	3.188	3.294	3.40
3/16	3.83	3.99	4.14	4.30	4.46	4.62	4.78	4.94	5.10
1/4	5.10	5.31	5.53	5.74	5.95	6.16	6.36	6.58	6.80
5/16	6.38	6.64	6.90	7.17	7.44	7.70	7.97	8.23	8.50
3/8	7.65	7.97	8.29	8.61	8.93	9.25	9.57	9.88	10.20
7/16	8.93	9.29	9.67	10.04	10.41	10.78	11.16	11.53	11.90
1/2	10.20	10.63	11.05	11.48	11.90	12.32	12.75	13.18	13.60
9/16	11.48	11.95	12.43	12.91	13.39	13.86	14.34	14.82	15.30
5/8	12.75	13.28	13.81	14.34	14.87	15.40	15.94	16.47	17.00
11/16	14.03	14.61	15.20	15.78	16.36	16.94	17.53	18.12	18.70
3/4	15.30	15.94	16.58	17.22	17.85	18.49	19.13	19.77	20.40
13/16	16.58	17.27	17.95	18.65	19.34	20.03	20.72	21.41	22.10
7/8	17.85	18.60	19.34	20.08	20.83	21.57	22.32	23.05	23.80
15/16	19.13	19.92	20.72	21.51	22.32	23.11	23.91	24.70	25.50
1	20.40	21.25	22.10	22.95	23.80	24.65	25.50	26.35	27.20
1 1/16	21.68	22.58	23.48	24.39	25.29	26.19	27.10	28.00	28.90
1 1/8	22.95	23.91	24.87	25.82	26.78	27.73	28.68	29.64	30.60
1 3/16	24.23	25.23	26.24	27.25	28.26	29.27	30.28	31.29	32.30
1 1/4	25.50	26.56	27.62	28.69	29.75	30.81	31.88	32.94	34.00
1 5/16	26.78	27.90	29.01	30.12	31.22	32.35	33.48	34.59	35.70
1 3/8	28.05	29.22	30.39	31.56	32.72	33.89	35.06	36.23	37.40
1 7/16	29.33	30.55	31.77	32.99	34.21	35.44	36.66	37.88	39.10
1 1/2	30.60	31.88	33.15	34.43	35.70	35.98	38.26	39.53	40.80
1 9/16	31.88	33.20	34.53	35.86	37.19	38.51	39.84	41.17	42.50
1 5/8	33.15	34.53	35.91	37.99	38.67	40.05	41.44	42.82	44.20
1 11/16	34.43	35.86	37.30	38.73	40.16	41.59	43.03	44.47	45.90
1 3/4	35.70	37.19	38.68	40.17	41.65	43.14	44.63	46.12	47.60
1 13/16	36.98	38.52	40.05	41.60	43.14	44.68	46.22	47.76	49.30
1 7/8	38.25	38.85	41.44	43.03	44.63	46.22	47.82	49.40	51.00
1 15/16	39.53	41.17	42.82	44.46	46.12	47.76	49.41	51.05	52.70
2	40.80	42.50	44.20	45.90	47.60	49.30	51.00	52.70	54.40

(Continued on next page)

*These figures are the theoretical weights, based on 489.6 lbs. per cubic foot of steel. Iron will run about 2% lighter.

Extras for Size and Quantity

CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

*WEIGHT PER LINEAL FOOT FLAT ROLLED STEEL

(CONTINUED)

Thickness Inches	WIDTH—INCHES								
	8¼	8½	8¾	9	9¼	9½	9¾	10	10¼
1/16	1.753	1.806	1.859	1.913	1.965	2.019	2.078	2.135	2.178
1/8	3.506	3.612	3.720	3.826	3.931	4.037	4.144	4.250	4.356
3/16	5.26	5.42	5.58	5.74	5.90	6.06	6.22	6.38	6.54
1/4	7.01	7.22	7.43	7.65	7.86	8.08	8.29	8.50	8.71
5/16	8.76	9.03	9.29	9.56	9.83	10.10	10.36	10.62	10.89
3/8	10.52	10.84	11.16	11.48	11.80	12.12	12.44	12.75	13.07
7/16	12.27	12.64	13.02	13.40	13.76	14.14	14.51	14.88	15.25
1/2	13.03	14.44	14.87	15.30	15.73	16.16	16.58	17.00	17.42
9/16	15.78	16.26	16.74	17.22	17.69	18.18	18.65	19.14	19.61
5/8	17.53	18.06	18.59	19.13	19.65	20.19	20.72	21.25	21.78
11/16	19.28	19.86	20.45	21.04	21.62	22.21	22.79	23.38	23.96
3/4	21.04	21.68	22.32	22.96	23.59	24.23	24.86	25.50	26.14
13/16	22.79	23.48	24.17	24.86	25.55	26.24	26.94	27.62	28.32
7/8	24.55	25.30	26.04	26.78	27.52	28.26	29.01	29.75	30.50
15/16	26.30	27.10	27.89	28.69	29.49	30.28	31.08	31.88	32.67
1	28.05	28.90	29.75	30.60	31.45	32.20	33.15	34.00	34.85
1 1/16	29.80	30.70	31.61	32.52	33.41	34.32	35.22	36.12	37.03
1 1/8	31.56	32.52	33.47	34.43	35.38	36.34	37.29	38.25	39.21
1 3/16	33.31	34.32	35.33	36.34	37.35	38.36	39.37	40.38	41.39
1 1/4	35.06	36.12	37.20	38.26	39.31	40 37	41.47	42.50	43.56
1 5/16	36.81	37.93	39.05	40.16	41.28	42.40	43.52	44.64	45.75
1 3/8	38.57	39.74	40.91	42.08	43.25	44.41	45.58	46.75	47.92
1 7/16	40.32	41.54	42.77	44.00	45.22	46.44	47.66	48.88	50.10
1 1/2	42.08	43.35	44.63	45.90	47.18	48.45	49.73	51.00	52.28
1 9/16	43.83	45.16	46.49	47.82	49.14	50.48	51.80	53.14	54.46
1 5/8	45.58	46.96	48.34	49.73	51.10	52.49	53.87	55.25	56.63
1 11/16	47.33	48.76	50.20	51.64	53.07	54.51	55.94	57.38	58.81
1 3/4	49.09	50.58	52.07	53.56	55.04	56.53	58.01	59.50	60.99
1 13/16	50.84	52.38	53.92	55.46	57.00	58.54	60.09	61.62	63.17
1 7/8	52.60	54.20	55.79	57.38	58.97	60.56	62.16	63.75	65.35
1 15/16	54.35	56.00	57.64	59.29	60.94	62.58	64.23	65.88	67.52
2	56.10	57.80	59.50	61.20	62.90	64.60	66.30	68.00	69.70

*These figures are the theoretical weights, based on 489.6 lbs. per cubic foot of steel. Iron will run about 2% lighter.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

*WEIGHT PER LINEAL FOOT FLAT ROLLED STEEL

(CONTINUED)

Thickness Inches	WIDTH—INCHES								
	10½	10¾	11	11¼	11½	11¾	12	12½	13
1/16	2.232	2.235	2.338	2.39	2.44	2.497	2.55	2.66	2.76
1/8	4.463	4.569	4.676	4.78	4.88	4.99	5.10	5.32	5.53
3/16	6.70	6.86	7.02	7.17	7.32	7.49	7.65	7.98	8.28
1/4	8.92	9.14	9.34	9.57	9.78	10.00	10.20	10.63	11.06
5/16	11.16	11.42	11.68	11.95	12.22	12.49	12.75	13.28	13.81
3/8	13.39	13.71	14.03	14.35	14.68	14.99	15.30	15.94	16.58
7/16	15.62	15.99	16.36	16.74	17.12	17.49	17.85	18.60	19.34
1/2	17.85	18.28	18.70	19.13	19.55	19.97	20.40	21.25	22.10
9/16	20.08	20.56	21.02	21.51	22.00	22.48	22.95	23.90	24.86
5/8	22.32	22.85	23.28	23.91	24.44	24.97	25.50	26.56	27.62
11/16	24.54	25.13	25.70	26.30	26.88	27.47	28.05	29.22	30.39
3/4	26.78	27.42	28.05	28.68	29.33	29.79	30.60	31.88	33.16
13/16	29.00	29.69	30.40	31.08	31.70	32.46	33.15	34.53	35.91
7/8	31.34	31.98	32.72	33.47	34.21	34.95	35.70	37.19	38.68
15/16	33.48	34.28	35.06	35.86	36.66	37.46	38.25	39.84	41.44
1	35.70	36.55	37.40	38.25	39.10	39.95	40.80	42.50	44.20
1 1/16	37.92	38.83	39.74	40.64	41.54	42.45	43.35	45.16	46.96
1 1/8	40.17	41.12	42.08	43.04	44.00	44.94	45.90	47.82	49.72
1 3/16	42.40	43.40	44.42	45.42	46.44	47.45	48.45	50.46	52.48
1 1/4	44.63	45.69	46.76	47.82	48.88	49.94	51.00	53.12	55.25
1 5/16	46.86	47.97	49.08	50.20	51.32	52.44	53.55	55.78	58.02
1 3/8	49.08	50.25	51.42	52.59	53.76	54.93	56.10	58.44	60.77
1 7/16	51.32	52.54	53.76	54.99	56.21	57.43	58.65	61.10	63.54
1 1/2	53.55	54.83	56.10	57.37	58.65	59.93	61.20	63.75	66.30
1 9/16	55.78	57.11	58.42	59.76	61.10	62.43	63.75	66.40	69.06
1 5/8	58.02	59.40	60.78	62.16	63.54	64.92	66.30	69.06	71.83
1 11/16	60.24	61.68	63.10	64.55	65.98	67.42	68.85	71.72	74.59
1 3/4	62.48	63.97	65.45	66.93	68.43	69.92	71.40	74.38	77.35
1 13/16	64.70	66.24	67.80	69.33	70.86	72.41	73.95	77.03	80.11
1 7/8	66.94	68.53	70.12	71.72	73.31	74.90	76.50	79.69	82.88
1 15/16	69.18	70.83	72.46	74.11	75.76	77.41	79.05	82.34	85.64
2	71.40	73.10	74.80	76.50	78.20	79.90	81.60	85.00	88.40

(Continued on next page)

*These figures are the theoretical weights, based on 489.6 lbs. per cubic foot of steel. Iron will run about 2% lighter.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

*WEIGHT PER LINEAL FOOT FLAT ROLLED STEEL

(CONTINUED)

Thickness Inches	WIDTH—INCHES								
	13½	14	14½	15	15½	16	16½	17	17½
1/16	2.87	2.97	3.08	3.19	3.29	3.40	3.51	3.613	3.72
1/8	5.74	5.95	6.16	6.38	6.58	6.80	7.01	7.226	7.43
3/16	8.61	8.92	9.25	9.56	9.88	10.20	10.52	10.84	11.16
1/4	11.48	11.90	12.32	12.75	13.18	13.60	14.03	14.44	14.87
5/16	14.34	14.88	15.40	15.94	16.47	17.00	17.53	18.06	18.59
3/8	17.22	17.86	18.49	19.14	19.77	20.40	21.04	21.68	22.22
7/16	20.08	20.82	21.57	22.32	23.05	23.80	24.55	25.28	26.04
1/2	22.95	23.80	24.65	25.50	26.35	27.20	28.05	28.89	29.75
9/16	25.82	26.78	27.73	28.70	29.64	30.60	31.56	32.52	33.47
5/8	28.69	29.74	30.81	31.88	32.94	34.00	35.06	36.12	37.20
11/16	31.56	32.72	33.89	35.06	36.23	37.40	38.57	39.74	40.91
3/4	34.43	35.71	36.98	38.26	39.53	40.80	42.08	43.36	44.63
13/16	37.29	38.67	40.05	41.43	42.82	44.20	45.58	46.96	48.34
7/8	40.17	41.65	43.14	44.62	46.12	47.60	49.09	50.60	52.07
15/16	43.03	44.63	46.22	47.82	49.40	51.00	52.60	54.20	55.79
1	45.90	47.60	49.30	51.00	52.70	54.40	56.10	57.80	59.50
1 1/16	48.76	50.57	52.04	54.20	56.00	57.80	59.60	61.40	63.20
1 1/8	51.52	53.55	55.05	57.37	59.30	61.20	63.10	65.04	66.95
1 3/16	54.51	56.52	58.54	60.56	62.58	64.60	66.62	68.64	70.66
1 1/4	57.38	59.50	61.62	63.76	65.88	68.00	70.14	72.26	74.38
1 5/16	60.25	62.47	64.70	66.95	69.18	71.40	73.63	75.86	78.10
1 3/8	63.11	65.45	67.79	70.12	72.46	74.80	77.14	79.48	81.81
1 7/16	65.08	68.42	70.88	73.32	75.76	78.20	80.64	83.08	85.54
1 1/2	68.86	71.40	73.96	76.51	79.05	81.60	84.16	86.70	89.26
1 9/16	71.72	74.38	77.03	79.69	82.35	85.00	87.62	90.31	92.97
1 5/8	74.59	77.35	80.12	82.88	85.64	88.40	91.17	93.93	96.69
1 11/16	77.46	80.33	83.20	86.06	88.93	91.80	94.67	97.54	100.4
1 3/4	80.33	83.30	86.28	89.25	92.23	95.20	98.18	101.2	104.2
1 13/16	83.20	86.28	89.36	92.44	95.52	98.60	101.7	104.8	107.9
1 7/8	86.07	89.25	92.44	95.63	98.82	102.0	105.2	108.4	111.5
1 15/16	88.93	92.23	95.52	98.81	102.1	105.4	108.7	112.0	115.3
2	91.80	95.20	98.60	102.0	105.4	108.8	112.2	115.6	119.0

*These figures are the theoretical weights, based on 489.6 lbs. per cubic foot of steel. Iron will run about 2% lighter.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

*WEIGHT PER LINEAL FOOT FLAT ROLLED STEEL

(CONTINUED)

Thickness Inches	WIDTH—INCHES								
	18	18½	19	19½	20	21	22	23	24
1/16	3.825	3.931	4.037	4.144	4.250	4.464	4.676	4.888	5.10
1/8	7.65	7.86	8.074	8.29	8.50	8.962	9.352	9.776	10.20
3/16	11.48	11.80	12.10	12.44	12.76	13.40	14.04	14.64	15.32
1/4	15.30	15.73	16.16	16.58	17.00	17.84	18.69	19.56	20.40
5/16	19.12	19.65	20.20	20.72	21.24	22.32	23.36	24.44	25.52
3/8	22.96	23.59	24.24	24.86	25.50	26.78	28.06	29.36	30.60
7/16	26.79	27.52	28.28	29.01	29.75	31.24	32.72	34.24	35.72
1/2	30.60	31.45	32.31	33.15	34.00	35.70	37.40	39.10	40.80
9/16	34.44	35.38	36.34	37.29	38.27	40.16	42.04	44.00	45.92
5/8	38.25	39.31	40.37	41.44	42.50	44.64	46.76	48.88	51.00
11/16	42.08	43.25	44.42	45.58	46.74	49.08	51.40	53.76	56.12
3/4	45.92	47.18	48.46	49.73	51.00	53.56	56.10	58.66	61.20
13/16	49.72	51.10	52.48	53.87	55.25	58.01	60.79	63.53	66.29
7/8	53.56	55.04	56.52	58.01	59.50	62.49	65.44	68.43	71.40
15/16	57.38	58.97	60.57	62.16	63.76	66.96	70.13	73.32	76.50
1	61.20	62.90	64.60	66.30	68.00	71.40	74.80	78.20	81.60
1 1/16	65.02	66.81	68.64	70.42	72.25	75.85	79.48	83.08	86.70
1 1/8	68.85	70.78	72.68	74.61	76.50	80.33	84.16	88.00	91.80
1 3/16	72.68	74.10	76.72	78.14	80.75	84.79	88.83	82.88	96.92
1 1/4	76.50	78.73	80.74	82.98	85.00	89.26	93.52	97.76	102.0
1 5/16	80.33	82.56	84.80	87.02	89.28	93.72	98.16	102.6	107.1
1 3/8	84.15	86.48	88.83	91.15	93.50	98.17	102.8	107.5	112.2
1 7/16	88.00	90.43	92.88	95.32	97.75	102.7	107.5	112.4	117.3
1 1/2	91.80	94.36	96.90	99.46	102.0	107.1	112.2	117.3	122.4
1 9/16	95.63	98.29	100.9	103.6	106.3	111.6	116.9	122.2	127.5
1 5/8	99.45	102.2	105.0	107.7	110.5	116.0	121.6	127.1	132.6
1 11/16	103.3	106.1	109.0	111.8	114.8	120.5	126.2	132.0	137.7
1 3/4	107.1	110.2	113.1	116.2	119.0	125.0	130.9	136.9	142.8
1 13/16	110.9	114.1	117.1	120.3	123.3	129.4	135.6	141.7	147.9
1 7/8	114.8	117.9	121.1	124.3	127.5	133.9	140.3	146.6	153.0
1 15/16	118.6	121.9	125.2	128.5	131.8	138.3	144.9	151.5	158.1
2	122.4	125.8	129.2	132.6	136.0	142.8	149.6	156.4	163.2

*These figures are the theoretical weights, based on 489.6 lbs. per cubic foot of steel. Iron will run about 2% lighter.

Philadelphia
RECent 7450
Park 5351

Baltimore
Vernon 8260

THEORETICAL WEIGHT OF STEEL CIRCLES

D I A.	THICKNESS 1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	1
1	.028	.042	.056	.069	.083	.097	.111	.125	.139	.153	.167	.181	.195	.223
2	.111	.166	.222	.278	.333	.389	.444	.502	.557	.612	.668	.724	.779	.892
3	.249	.375	.500	.626	.749	.874	.999	1.13	1.25	1.37	1.50	1.63	1.75	2.01
4	.444	.666	.888	1.11	1.33	1.55	1.78	2.01	2.23	2.45	2.67	2.90	3.12	3.57
5	.693	1.04	1.388	1.74	2.08	2.43	2.78	3.14	3.48	3.89	4.18	4.52	4.87	5.58
6	.998	1.50	2.00	2.51	3.00	3.50	4.00	4.52	5.01	5.51	6.01	6.51	7.01	8.30
7	1.36	2.04	2.72	3.41	4.08	4.76	5.44	6.15	6.82	7.50	8.19	8.87	9.55	10.93
8	1.77	2.66	3.55	4.45	5.33	6.22	7.11	8.03	8.91	9.80	10.69	11.58	12.47	14.28
9	2.25	3.37	4.50	5.69	6.74	7.87	9.00	10.16	11.28	12.41	13.53	14.66	15.78	18.07
10	2.77	4.16	5.55	6.96	8.33	9.72	11.11	12.54	13.93	15.36	16.71	18.10	19.49	22.31
11	3.35	5.04	6.72	8.42	10.07	11.76	13.44	15.18	16.85	18.53	20.21	21.90	23.58	26.99
12	3.99	5.99	8.00	10.02	11.99	13.99	15.99	18.06	20.05	22.05	24.06	26.06	28.06	32.12
13	4.69	7.03	9.38	11.76	14.07	16.42	18.77	21.11	23.53	25.88	28.23	30.58	32.93	37.70
14	5.43	8.16	10.88	13.64	16.32	19.04	21.77	24.58	26.29	30.02	32.74	35.47	38.19	43.72
15	6.24	9.37	12.49	15.66	18.73	21.86	24.99	28.22	31.33	33.46	37.59	40.71	43.84	50.19
16	7	11	15	18	22	25	29	32	35	39	42	46	49	56
17	8	12	16	20	24	28	32	36	40	44	48	52	56	64
18	9	14	18	23	27	32	36	40	45	49	54	58	63	71
19	10	15	20	25	30	35	40	45	50	55	60	65	70	80
20	11	17	23	28	34	39	45	50	55	61	66	72	77	88
21	12	19	25	31	37	43	49	55	61	67	73	79	85	97
22	14	20	27	34	41	47	54	60	67	73	80	87	93	107
23	15	22	30	37	44	52	59	66	73	80	88	95	102	117
24	16	24	32	40	48	56	64	71	79	87	95	103	111	127
25	18	26	35	44	53	61	70	78	86	95	103	112	121	138
26	19	28	38	47	56	66	75	84	93	103	112	121	131	149
27	20	30	41	51	61	71	81	91	101	111	121	131	141	161
28	22	33	44	55	65	76	87	97	108	119	130	141	152	173
29	24	35	47	59	71	82	94	104	116	127	139	151	163	186
30	25	38	50	63	75	88	100	112	124	137	149	162	174	199
31	27	40	54	67	80	94	107	119	133	146	159	173	186	212
32	29	43	57	71	86	100	114	127	141	156	170	184	198	226
33	30	45	61	76	91	106	121	135	150	165	180	196	211	241
34	32	48	65	81	97	113	129	144	160	176	192	208	224	255
35	34	51	68	85	102	119	136	152	169	186	203	220	237	271
36	36	54	72	90	108	126	144	162	180	198	216	234	252	288
37	38	57	76	95	115	134	153	172	191	210	229	248	267	306
38	40	60	80	100	121	141	161	181	201	221	241	261	281	322
39	42	64	85	106	127	148	169	190	212	233	254	275	296	338
40	45	67	89	111	134	156	178	200	223	245	267	289	312	356
41	47	70	94	117	141	164	187	211	234	258	281	304	327	374
42	49	74	98	123	148	172	197	221	246	270	295	319	344	394
43	52	77	103	129	155	180	206	232	258	283	309	335	360	412
44	54	81	108	135	162	188	215	242	269	296	323	350	377	430
45	56	85	113	141	169	197	225	253	282	310	338	366	394	450
46	59	88	118	147	177	206	235	265	294	324	353	383	412	475
47	62	92	123	154	185	215	246	277	308	338	369	399	430	492
48	64	96	128	160	193	225	257	289	321	353	385	417	449	514
49	67	100	134	167	201	234	267	301	334	367	401	434	467	534
50	70	105	139	174	209	244	279	313	348	383	418	452	487	558
51	...	109	145	181	217	253	289	325	362	398	434	470	506	578
52	...	113	151	188	226	263	301	339	376	414	452	489	527	602
53	...	117	156	195	235	273	313	352	391	430	469	508	547	626
54	...	122	162	203	244	284	325	365	406	446	487	527	568	650
55	...	126	168	210	253	295	337	379	421	463	505	547	589	674
56	...	131	175	218	262	305	349	393	436	480	524	567	610	698
57	...	136	181	226	272	317	362	407	453	498	543	587	633	724
58	...	141	187	234	281	328	375	421	468	515	562	609	655	750
59	...	145	194	242	291	339	387	436	484	533	581	629	678	774
60	...	150	200	250	301	351	401	451	501	551	601	651	701	802
61	...	155	207	259	311	362	414	466	518	569	621	673	724	828
62	...	161	214	268	321	375	428	482	535	589	642	695	749	856
63	...	166	221	276	332	387	442	497	553	608	663	718	774	884
64	...	171	228	285	342	399	456	513	570	627	684	741	798	912
65	...	177	235	294	353	412	471	529	588	647	706	764	823	942
66	...	182	243	303	364	425	485	546	607	667	728	788	848	970
67	...	188	250	313	375	438	500	563	625	688	750	812	874	1000
68	...	193	257	322	386	450	515	579	643	708	772	836	900	1030
69	...	199	265	331	398	464	530	596	663	729	795	861	927	1060
70	...	205	273	341	409	477	545	613	682	750	818	886	954	1090
71	...	211	281	351	421	491	561	631	702	772	842	912	982	1122
72	...	217	289	361	433	505	577	649	722	794	866	937	1009	1154
73	...	223	297	371	445	519	593	667	742	816	890	964	1038	1186
74	...	226	305	381	458	534	610	686	763	839	915	990	1066	1220
75	...	235	313	391	470	548	626	704	783	861	939	1017	1095	1252

(Continued on next page)

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

THEORETICAL WEIGHT OF STEEL CIRCLES

D I A.	THICKNESS ¼	5/16	⅜	7/16	½	9/16	⅝	11/16	¾	13/16	⅞	15/16	1
76	322	402	482	563	643	723	804	884	964	1045	1125	....	1286
77	330	413	495	578	660	743	825	908	990	1073	1155	....	1320
78	339	423	508	593	678	762	847	932	1016	1101	1186	....	1356
79	348	434	521	608	695	782	869	956	1043	1129	1216	....	1390
80	356	445	534	623	713	802	891	980	1069	1158	1247	....	1426
81	365	457	548	639	731	822	913	1004	1096	1187	1278	....	1462
82	374	468	561	655	749	842	936	1029	1123	1217	1310	....	1498
83	384	479	575	671	767	863	959	1055	1151	1246	1342	....	1534
84	393	491	589	687	786	884	982	1080	1179	1277	1375	....	1572
85	402	503	603	704	805	905	1006	1106	1207	1307	1408	....	1610
86	412	515	618	721	824	926	1029	1132	1235	1338	1441	....	1648
87	422	527	632	738	843	948	1054	1159	1265	1370	1475	....	1686
88	431	539	647	755	863	970	1078	1186	1294	1402	1509	....	1726
89	441	551	661	771	882	992	1102	1212	1323	1433	1543	....	1764
90	451	564	677	789	902	1015	1128	1240	1353	1466	1579	....	1804
91	461	576	692	807	922	1037	1153	1268	1383	1495	1614	....	1844
92	471	589	707	825	943	1060	1178	1296	1414	1532	1649	....	1886
93	482	602	722	843	963	1084	1204	1324	1445	1565	1686	....	1926
94	492	615	738	861	984	1107	1230	1353	1476	1599	1722	....	1968
95	503	628	754	879	1005	1131	1256	1382	1507	1633	1759	....	2010
96	513	641	769	897	1026	1154	1282	1410	1538	1666	1795	....	....
97	524	654	785	916	1047	1178	1309	1440	1570	1701	1832	....	....
98	535	668	801	935	1069	1202	1336	1469	1603	1737	1870	....	....
99	546	682	818	954	1091	1227	1363	1500	1636	1772	1908	....	....
100	557	696	835	974	1113	1252	1391	1530	1669	1809	1948	....	....
101	568	710	852	994	1136	1278	1420	1562	1704	1846	1988	2130	2272
102	579	724	869	1014	1158	1303	1448	1593	1738	1882	2027	2172	2317
103	591	739	886	1034	1182	1329	1477	1624	1772	1919	2067	2214	2363
104	602	753	903	1054	1204	1355	1505	1656	1806	1957	2107	2258	2409
105	614	768	921	1074	1228	1381	1534	1688	1841	1994	2148	2302	2455
106	626	782	939	1095	1251	1408	1564	1720	1877	2033	2189	2346	2502
107	637	797	956	1116	1275	1434	1593	1753	1912	2071	2231	2390	2550
108	649	812	974	1136	1299	1461	1623	1786	1948	2110	2273	2435	2598
109	662	827	992	1158	1323	1488	1653	1819	1984	2149	2315	2480	2646
110	673	842	1010	1179	1347	1516	1684	1853	2021	2189	2358	2526	2695
111	686	857	1028	1200	1372	1543	1715	1886	2058	2229	2401	2572	2744
112	693	873	1048	1222	1397	1571	1746	1920	2095	2270	2444	2619	2793
113	711	889	1066	1244	1422	1599	1777	1955	2133	2310	2488	2666	2844
114	724	904	1085	1266	1447	1628	1809	1990	2171	2351	2532	2713	2894
115	736	920	1104	1288	1473	1657	1841	2025	2209	2393	2577	2761	2945
116	749	936	1124	1311	1498	1686	1873	2060	2247	2435	2622	2809	2997
117	762	953	1143	1334	1524	1715	1905	2096	2286	2477	2667	2858	3048
118	775	969	1163	1357	1550	1744	1938	2132	2326	2519	2713	2907	3101
119	788	985	1183	1380	1577	1774	1971	2168	2365	2562	2759	2956	3154
120	802	1002	1203	1403	1604	1804	2005	2205	2406	2606	2807	3007	3208
121	815	1019	1223	1426	1630	1834	2038	2242	2445	2649	2853	3057	3260
122	829	1036	1243	1450	1657	1864	2072	2279	2486	2693	2900	3107	3314
123	842	1053	1262	1474	1685	1895	2106	2316	2527	2737	2948	3159	3369
124	856	1070	1284	1498	1712	1926	2140	2354	2568	2782	2996	3210	3424
125	870	1087	1305	1522	1740	1957	2175	2392	2610	2827	3045	3262	3480
126	884	1105	1326	1547	1768	1989	2210	2431	2652	2872	3093	3315	3535
127	898	1122	1347	1571	1796	2020	2245	2469	2694	2918	3143	3367	3592
128	912	1140	1368	1596	1824	2052	2280	2508	2736	2964	3192	3420	3649
129	926	1158	1390	1621	1853	2085	2316	2548	2779	3011	3242	3474	3706
130	941	1176	1411	1646	1882	2117	2352	2587	2822	3058	3293	3528	3764
131	955	1194	1433	1672	1911	2150	2389	2627	2866	3105	3344	3583	3822
132	970	1213	1455	1698	1940	2183	2425	2668	2910	3153	3395	3638	3880
133	985	1231	1477	1723	1970	2216	2462	2708	2954	3200	3446	3693	3939
134	1000	1250	1500	1750	1999	2249	2499	2749	2999	3249	3499	3749	3999
135	1015	1268	1522	1775	2030	2284	2537	2790	3044	3298	3551	3805	4059
136	1029	1286	1543	1801	2058	2315	2572	2830	3087	3344	3601	3859	4116
137	1044	1305	1566	1827	2088	2349	2610	2871	3132	3393	3654	3916	4177
138	1059	1324	1589	1854	2119	2384	2649	2914	3178	3443	3708	3973	4238
139	1075	1344	1612	1881	2150	2418	2687	2956	3225	3493	3762	4031	4300
140	1090	1363	1636	1908	2181	2453	2726	2999	3271	3544	3816	4089	4362
141	1106	1383	1659	1936	2212	2489	2765	3042	3318	3595	3871	4148	4424
142	1122	1402	1683	1963	2244	2524	2804	3085	3365	3646	3926	4207	4487
143	1138	1422	1706	1991	2275	2560	2844	3128	3413	3697	3982	4266	4551
144	1154	1442	1730	2019	2307	2596	2884	3172	3461	3749	4038	4326	4614

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

CIRCUMFERENCE AND AREA OF STEEL CIRCLES

Dia. in Inches	Circum. in Ft.	Circum. in In.	Area Sq. Ft.	Dia. in Inches	Circum. in Ft.	Circum. in In.	Area Sq. Ft.
1/16		13/64		7	1	9 15/16	.2673
1/8		25/64		7 1/8	1	10 3/8	.2763
3/16		19/32		7 1/4	1	10 3/4	.2867
1/4		25/32		7 3/8	1	11 1/8	.2966
5/16		63/64		7 1/2	1	11 1/2	.3068
3/8		1 11/64		7 5/8	1	11 15/16	.3164
7/16		1 3/8		7 3/4	2	5/16	.3275
1/2		1 37/64		7 7/8	2	11/16	.3382
9/16		1 49/64		8	2	1 1/8	.3491
5/8		1 15/16		8 1/8	2	1 1/2	.3601
11/16		2 5/32		8 1/4	2	1 7/8	.3712
3/4		2 23/64		8 3/8	2	2 1/4	.3826
13/16		2 35/64		8 1/2	2	2 11/16	.3941
7/8		2 3/4		8 5/8	2	3 1/16	.4057
15/16		2 15/16		8 3/4	2	3 7/16	.4176
1		3 9/64	.0055	8 7/8	2	3 7/8	.4296
1 1/8		3 1/2	.0069	9	2	4 1/4	.4418
1 1/4		3 7/8	.0085	9 1/8	2	4 5/8	.4541
1 3/8		4 5/16	.0103	9 1/4	2	5	.4667
1 1/2		4 11/16	.0123	9 3/8	2	5 7/16	.4794
1 5/8		5 1/16	.0144	9 1/2	2	5 13/16	.4922
1 3/4		5 7/16	.0167	9 5/8	2	6 3/16	.5053
1 7/8		5 7/8	.0192	9 3/4	2	6 5/8	.5185
2		6 1/4	.0218	9 7/8	2	7	.5319
2 1/8		6 5/8	.0246	10	2	7 3/8	.5454
2 1/4		7	.0276	10 1/8	2	7 3/4	.5591
2 3/8		7 7/16	.0308	10 1/4	2	8 3/16	.5730
2 1/2		7 13/16	.0341	10 3/8	2	8 9/16	.5871
2 5/8		8 3/16	.0376	10 1/2	2	8 15/16	.6013
2 3/4		8 5/8	.0412	10 5/8	2	9 3/8	.6157
2 7/8		9	.0451	10 3/4	2	9 3/4	.6303
3		9 3/8	.0491	10 7/8	2	10 3/16	.6450
3 1/8		9 13/16	.0533	11	2	10 1/2	.6600
3 1/4		10 3/16	.0576	11 1/8	2	10 15/16	.6750
3 3/8		10 9/16	.0621	11 1/4	2	11 5/16	.6902
3 1/2		10 15/16	.0668	11 3/8	2	11 11/16	.7057
3 5/8		11 3/8	.0717	11 1/2	3	1/8	.7213
3 3/4		11 3/4	.0767	11 5/8	3	1/2	.7371
3 7/8	1	1/8	.0819	11 3/4	3	7/8	.7530
4	1	9/16	.0873	11 7/8	3	1 1/4	.7690
4 1/8	1	15/16	.0928	12	3	1 11/16	.7854
4 1/4	1	1 5/16	.0985	12 1/8	3	2 1/16	.8019
4 3/8	1	1 11/16	.1044	12 1/4	3	2 7/16	.8185
4 1/2	1	2 1/8	.1104	12 3/8	3	2 7/8	.8353
4 5/8	1	2 1/2	.1167	12 1/2	3	3 1/4	.8523
4 3/4	1	2 7/8	.1230	12 5/8	3	3 5/8	.8694
4 7/8	1	3 5/16	.1237	12 3/4	3	4	.8867
5	1	3 11/16	.1364	12 7/8	3	4 7/16	.9041
5 1/8	1	4 1/16	.1433	13	3	4 13/16	.9218
5 1/4	1	4 7/16	.1503	13 1/8	3	5 3/16	.9396
5 3/8	1	4 7/8	.1575	13 1/4	3	5 5/8	.9576
5 1/2	1	5 1/4	.1650	13 3/8	3	6	.9757
5 5/8	1	5 5/8	.1726	13 1/2	3	6 3/8	.9940
5 3/4	1	6	.1803	13 5/8	3	6 3/4	1.013
5 7/8	1	6 7/16	.1883	13 3/4	3	7 3/16	1.031
6	1	6 13/16	.1964	13 7/8	3	7 9/16	1.050
6 1/8	1	7 3/16	.2046	14	3	7 15/16	1.069
6 1/4	1	7 5/8	.2131	14 1/8	3	8 3/8	1.088
6 3/8	1	8	.2217	14 1/4	3	8 3/4	1.108
6 1/2	1	8 3/8	.2304	14 3/8	3	9 1/8	1.127
6 5/8	1	8 3/4	.2394	14 1/2	3	9 1/2	1.147
6 3/4	1	9 3/16	.2485	14 5/8	3	9 15/16	1.167
6 7/8	1	9 9/16	.2578	14 3/4	3	10 5/16	1.187
				14 7/8	3	10 11/16	1.207

In order to get circumferences for fractions of inches or feet add the circumference of the fraction to the circumference of the whole number.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

CIRCUMFERENCE AND AREA OF STEEL CIRCLES

Dia. in Inches	Circum. in Ft.	Circum. in In.	Area Sq. Ft.	Dia. in Inches	Circum. in Ft.	Circum. in In.	Area Sq. Ft.
15	3	11 1/16	1.227	23	6	1/4	2.885
15 1/8	3	11 1/2	1.248	23 1/8	6	5/8	2.917
15 1/4	3	11 7/8	1.268	23 1/4	6	1	2.948
15 3/8	4	1/4	1.289	23 3/8	6	1 3/8	2.980
15 1/2	4	5/8	1.310	23 1/2	6	1 13/16	3.012
15 5/8	4	1 1/16	1.332	23 5/8	6	2 3/16	3.044
15 3/4	4	1 7/8	1.353	23 3/4	6	2 9/16	3.076
15 7/8	4	1 13/16	1.375	23 7/8	6	3	3.109
16	4	2 1/4	1.396	24	6	3 3/8	3.141
16 1/8	4	2 5/8	1.418	24 1/4	6	4 1/8	3.207
16 1/4	4	3	1.440	24 1/2	6	4 15/16	3.274
16 3/8	4	3 7/16	1.463	24 3/4	6	5 3/4	3.341
16 1/2	4	3 13/16	1.485	25	6	6 1/2	3.408
16 5/8	4	4 1/4	1.508	25 1/4	6	7 5/16	3.477
16 3/4	4	4 5/8	1.530	25 1/2	6	8 1/16	3.546
16 7/8	4	5	1.553	25 3/4	6	8 7/8	3.616
17	4	5 3/8	1.576	26	6	9 5/8	3.687
17 1/8	4	5 3/4	1.599	26 1/4	6	10 7/16	3.758
17 1/4	4	6 3/16	1.623	26 1/2	6	11 1/4	3.830
17 3/8	4	6 9/16	1.647	26 3/4	7		3.900
17 1/2	4	6 15/16	1.670	27	7	13/16	3.976
17 5/8	4	7 5/16	1.694	27 1/4	7	1 9/16	4.050
17 3/4	4	7 3/4	1.712	27 1/2	7	2 3/8	4.125
17 7/8	4	8 1/8	1.743	27 3/4	7	3 1/8	4.200
18	4	8 1/2	1.767	28	7	3 15/16	4.276
18 1/8	4	8 15/16	1.792	28 1/4	7	4 11/16	4.353
18 1/4	4	9 5/16	1.817	28 1/2	7	5 1/2	4.430
18 3/8	4	9 3/4	1.842	28 3/4	7	6 1/4	4.508
18 1/2	4	10 1/16	1.866	29	7	7 1/16	4.586
18 5/8	4	10 1/2	1.892	29 1/4	7	7 7/8	4.666
18 3/4	4	10 7/8	1.918	29 1/2	7	8 5/8	4.746
18 7/8	4	11 1/4	1.943	29 3/4	7	9 7/16	4.827
19	4	11 5/8	1.968	30	7	10 3/16	4.908
19 1/8	5	1/16	1.995	30 1/4	7	11	4.990
19 1/4	5	7/16	2.021	30 1/2	7	11 13/16	5.073
19 3/8	5	13/16	2.047	30 3/4	8	9/16	5.157
19 1/2	5	1 1/4	2.074	31	8	1 3/8	5.241
19 5/8	5	1 5/8	2.100	31 1/4	8	2 1/8	5.326
19 3/4	5	2	2.127	31 1/2	8	2 15/16	5.412
19 7/8	5	2 3/8	2.154	31 3/4	8	3 11/16	5.498
20	5	2 13/16	2.181	32	8	4 1/2	5.585
20 1/8	5	3 1/16	2.209	32 1/4	8	5 5/16	5.672
20 1/4	5	3 9/16	2.237	32 1/2	8	6 1/16	5.760
20 3/8	5	4	2.264	32 3/4	8	6 7/8	5.849
20 1/2	5	4 3/8	2.292	33	8	7 5/8	5.939
20 5/8	5	4 3/4	2.320	33 1/4	8	8 7/16	6.029
20 3/4	5	5 1/16	2.348	33 1/2	8	9 3/16	6.121
20 7/8	5	5 5/16	2.377	33 3/4	8	10	6.212
21	5	5 15/16	2.405	34	8	10 13/16	6.305
21 1/8	5	6 5/16	2.434	34 1/4	8	11 9/16	6.398
21 1/4	5	6 3/4	2.463	34 1/2	9	3/8	6.490
21 3/8	5	7 1/8	2.492	34 3/4	9	1 1/8	6.581
21 1/2	5	7 1/2	2.521	35	9	1 15/16	6.681
21 5/8	5	7 7/8	2.551	35 1/4	9	2 11/16	6.771
21 3/4	5	8 5/16	2.580	35 1/2	9	3 1/2	6.873
21 7/8	5	8 11/16	2.607	35 3/4	9	4 1/4	6.970
22	5	9 1/16	2.639	36	9	5 1/16	7.068
22 1/8	5	9 1/2	2.670	36 1/4	9	5 7/8	7.167
22 1/4	5	9 7/8	2.700	36 1/2	9	6 5/8	7.266
22 3/8	5	10 1/4	2.730	36 3/4	9	7 7/16	7.361
22 1/2	5	10 5/8	2.761				
22 5/8	5	11 1/16	2.792				
22 3/4	5	11 7/16	2.823				
22 7/8	5	11 13/16	2.854				

In order to get circumferences for fractions of inches or feet add the circumference of the fraction to the circumference of the whole number.

Extras for Size and Quantity

CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

CIRCUMFERENCE AND AREA OF STEEL CIRCLES

Dia. in Inches	Circum. in Ft.	In.	Area Sq. Ft.	Dia. in Inches	Circum. in Ft.	In.	Area Sq. Ft.
37	9	8 3/16	7.466	52½	13	8⅞	15.033
37¼	9	9	7.568	52¾	13	9 11/16	15.176
37½	9	9¾	7.670	53	13	10½	15.320
37¾	9	10 9/16	7.770	53¼	13	11¼	15.465
38	9	11⅜	7.875	53½	14	1/16	15.611
38¼	10	⅛	7.979	53¾	14	13/16	15.757
38½	10	15/16	8.081	54	14	1⅝	15.904
38¾	10	1 11/16	8.189	54¼	14	2⅜	16.052
39	10	2½	8.295	54½	14	3 5/16	16.200
39¼	10	3¼	8.403	54¾	14	4	16.349
39½	10	4 1/16	8.509	55	14	4¾	16.499
39¾	10	4⅞	8.618	55¼	14	5 9/16	16.649
40	10	5⅝	8.726	55½	14	6 5/16	16.800
40¼	10	6 7/16	8.831	55¾	14	7⅛	16.952
40½	10	7 3/16	8.941	56	14	7⅞	17.104
40¾	10	8	9.051	56¼	14	8 11/16	17.257
41	10	8¾	9.168	56½	14	9½	17.411
41¼	10	9 9/16	9.280	56¾	14	10¼	17.565
41½	10	10⅜	9.391	57	14	11 1/16	17.721
41¾	10	11⅛	9.501	57¼	14	11 13/16	17.876
42	10	11 15/16	9.621	57½	15	⅝	18.032
42¼	11	1 1/16	9.736	57¾	15	1⅜	18.190
42½	11	1½	9.851	58	15	2 3/16	18.348
42¾	11	2¼	9.968	58¼	15	2 15/16	18.506
43	11	3 1/16	10.084	58½	15	3¾	18.665
43¼	11	3 13/16	10.202	58¾	15	4 9/16	18.825
43½	11	4⅝	10.320	59	15	5 5/16	18.986
43¾	11	5⅜	10.439	59¼	15	6⅛	19.147
44	11	6 3/16	10.559	59½	15	6⅞	19.309
44¼	11	7	10.679	59¾	15	7 11/16	19.471
44½	11	7¾	10.800	60	15	8 7/16	19.635
44¾	11	8 9/16	10.922	60¼	15	9¼	19.799
45	11	9⅜	11.044	60½	15	10 1/16	19.964
45¼	11	10⅛	11.161	60¾	15	10 13/16	20.129
45½	11	10 15/16	11.290	61	15	11⅝	20.295
45¾	11	11 11/16	11.415	61¼	16	⅜	20.462
46	12	½	11.540	61½	16	1 3/16	20.623
46¼	12	1¼	11.666	61¾	16	1 15/16	20.797
46½	12	2 1/16	11.793	62	16	2¾	20.966
46¾	12	2 13/16	11.920	62¼	16	3 9/16	21.135
47	12	3⅝	12.048	62½	16	4 5/16	21.306
47¼	12	4 1/16	12.177	62¾	16	5⅛	21.476
47½	12	5 3/16	12.306	63	16	5⅞	21.648
47¾	12	6	12.436	63¼	16	6 11/16	21.819
48	12	6¾	12.566	63½	16	7 7/16	21.992
48¼	12	7 9/16	12.697	63¾	16	8¼	22.166
48½	12	8 5/16	12.829	64	16	9	22.340
48¾	12	9⅛	12.961	64¼	16	9 13/16	22.515
49	12	9 15/16	13.095	64½	16	10⅝	22.695
49¼	12	10 11/16	13.229	64¾	16	11⅜	22.867
49½	12	11½	13.363	65	17	3/16	23.044
49¾	13	¼	13.499	65¼	17	15/16	23.222
50	13	1 1/16	13.635	65½	17	1¾	23.400
50¼	13	1 13/16	13.772	65¾	17	2½	23.578
50½	13	2⅝	13.909	66	17	3 5/16	23.758
50¾	13	3⅜	14.047	66¼	17	4⅛	23.939
51	13	4 3/16	14.186	66½	17	4⅞	24.119
51¼	13	5	14.325	66¾	17	5 11/16	24.307
51½	13	5¾	14.465	67	17	6 7/16	24.484
51¾	13	6 9/16	14.606	67¼	17	7¼	24.667
52	13	7 5/16	14.748	67½	17	8	24.851
52¼	13	8⅛	14.890	67¾	17	8 13/16	25.035

In order to get circumferences for fractions of inches or feet add the circumference of the fraction to the circumference of the whole number.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

CIRCUMFERENCE AND AREA OF STEEL CIRCLES

Dia. in Inches	Circum. in Ft.	Circum. in In.	Area Sq. Ft.
68	17	9⅝	25.220
68¼	17	10⅜	25.406
68½	17	11⅜	25.592
68¾	17	11 15/16	25.779
69	18	¾	25.967
69¼	18	1½	26.156
69½	18	2 5/16	26.345
69¾	18	3⅛	26.535
70	18	3⅞	26.725
70¼	18	4 11/16	26.920
70½	18	5 7/16	27.110
70¾	18	6¼	27.301
71	18	7	27.494
71¼	18	7 13/16	27.690
71½	18	8 9/16	27.881
71¾	18	9⅜	28.080
72	18	10 3/16	28.274
72½	18	11¾	28.670
73	19	1 5/16	29.065
73½	19	2⅞	29.465
74	19	4 7/16	29.867
74½	19	6	30.272
75	19	7 9/16	30.680
75½	19	9 3/16	31.090
76	19	10¾	31.503
76½	20	5/16	31.920
77	20	1⅞	32.338
77½	20	3 7/16	32.759
78	20	5	33.183
78½	20	6 9/16	33.610
79	20	8⅛	34.039
79½	20	9¾	34.472
80	20	11 5/16	34.907
80½	21	⅞	35.344
81	21	2 7/16	35.785
81½	21	4	36.228
82	21	5 9/16	36.674
82½	21	7⅛	37.122
83	21	8¾	37.574
83½	21	10 5/16	38.028
84	21	11⅞	38.485
84½	22	1 7/16	38.944
85	22	3	39.406
85½	22	4 9/16	39.872
86	22	6⅛	40.339
86½	22	7 11/16	40.809
87	22	9 5/16	41.282
87½	22	10⅞	41.758
88	23	7/16	42.237
88½	23	2	42.718
89	23	3 9/16	43.202
89½	23	5⅛	43.689
90	23	6 11/16	44.177
90½	23	8 5/16	44.671
91	23	9⅞	45.166
91½	23	11 7/16	45.663
92	24	1	46.164
92½	24	1 9/16	46.667
93	24	4⅛	47.173
93½	24	5 11/16	47.681
94	24	7¼	48.193
94½	24	8⅞	48.707
95	24	10 7/16	49.224
95½	25		49.743
96	25	1 9/16	50.265
96½	25	3⅛	50.790
97	25	4 11/16	51.318
97½	25	6¼	51.849
98	25	7⅞	52.382
98½	25	9 7/16	52.917
99	25	11	53.456
99½	26	9/16	53.997
100	26	2⅛	54.542
100½	26	3 11/16	55.088
101	26	5¼	55.638
101½	26	6 13/16	56.191
102	26	8 7/16	56.745
102½	26	10	57.303
103	26	11 9/16	57.863
103½	27	1⅛	58.427
104	27	2 11/16	58.992
104½	27	4¼	59.562
105	27	5 13/16	60.132
105½	27	7 7/16	60.705
106	27	9	61.283
106½	27	10 9/16	61.861
107	28	⅛	62.446
107½	28	1 11/16	63.030
108	28	3¼	63.617
108½	28	4 13/16	64.208
109	28	6⅜	64.801
109½	28	8	65.396
110	28	9 9/16	65.995
110½	28	11⅛	66.596
111	29	11/16	67.201
111½	29	2¼	67.808
112	29	3 13/16	68.417
112½	29	5⅜	69.030
113	29	7	69.644
113½	29	8 9/16	70.262
114	29	10⅛	70.882
114½	29	11 11/16	71.506
115	30	1¼	72.131
115½	30	2 13/16	72.759
116	30	4⅜	73.391
116½	30	5 15/16	74.026
117	30	7 9/16	74.662
117½	30	9⅛	75.301
118	30	10 11/16	75.944
118½	31	¼	76.589
119	31	1 13/16	77.236
119½	31	3⅜	77.887
120	31	4 15/16	78.540

In order to get circumferences for fractions of inches or feet add the circumference of the fraction to the circumference of the whole number.

Extras for Size and Quantity

CUTTING EXTRAS

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

EXTRAS FOR SIZE

TOOL STEEL

ROUNDS, OCTAGONS, QUARTER OCTAGONS AND HEXAGONS

All intermediate sizes take next higher extra.
Base sizes 1½″ to 2¾″ inclusive.

Size	Extra per lb. Cents
1/4″ and 9/32″	5.0
5/16″ and 11/32″	4.0
3/8″ to 15/32″ inclusive	3.0
1/2″ to 19/32″ inclusive	2.0
5/8″ to 31/32″ inclusive	1.0
1″ to 1 15/32″ inclusive	0.5
1½″ to 2¾″ inclusive	Base
2 13/16″ to 3″ inclusive	0.5

Size	Extra per lb. Cents
3 1/8″ to 4″ inclusive	1.0
4 1/8″ to 5″ inclusive	2.0
5 1/8″ to 6″ inclusive	4.0
6 1/8″ to 7″ inclusive	4.5
7 1/8″ to 8″ inclusive	3.75
8 1/8″ to 9″ inclusive	3.0
9 1/8″ to 10″ inclusive	2.5
10 1/8″ to 12″ inclusive	2.0

SQUARES AND FLATS

Width of Section Inches	Thickness of Section—Inches																							
	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	3 1/2	4	5	6	7	8	9	10
1/4 3/16 3/8	30 25 20	20 15 10	10 8 6	6.5 5	4																		
1/2 3/4 1	10 7 6	7 5 4	5 4 3	4 3 2	3 2 1.5	2 1.5 1	2 1 0.5	1 0.5	0.5	EXTRAS IN CENTS PER POUND													
1 1/4 1 1/2 1 3/4	5 5 5	3 3 3	2 1.5 1.5	1.5 1 1	1 1 1	1 0.5 0.5	0.5 B B	0.5 B B	0.5 B B	0.5 B B	B B B												
2 2 1/4 2 1/2	5 5 5	3 3 3	1.5 1.5 1.5	1 1 1	1 1 1	0.5 0.5 0.5	B B B	B B B	B B B	B B B	B B B	B B B	B B B										
3 4 5	5 5 6	3 3 4	1.5 1.5 2.5	1 1 2	1 1 2	0.5 1 2	B 1 2	B 1 2	B 1 2	B 1 2	B 1 2	1 1.5 2	1 1.5 2	B 1 1.5 2	1 1.5 2	1.5 2	1.5 2	2	2.5 2.5 2.5	2.5 2.5 2.5	2.5	3 3 3	3 3.5 4
6 7 8	8 10	6 8	4.0 6	3.5 5 6	3 3 4	3 3 4	3 3 4	3 3 4	3 3 3.5	2.5 2.5 3	2.5 2.5 2.5	2.5 2.5 2.5	2.5 2.5 2.5	2.5 2.5 2.5	2.5 2.5 2.5	2.5 2.5 2.5	2.5 2.5 2.5	2.5 2.5 2.5	2.5 2.5 2.5	2.5 2.5 2.5	2.5	3 3 3	3 3.5 4
9 10 11 12	. . . .	. . . .	. . . .	. . . .	. . . .	5 6 7 8	5 6 7 8	5 6 7 8	4 4.5 5 5.5	3.5 3.5 4 4.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3 3 3.5	3 3.5 4

Extras for Quantity on page 294.
Intermediate sizes take next higher extra.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

EXTRAS FOR SIZE

HIGH SPEED STEEL

ROUNDS, OCTAGONS, QUARTER OCTAGONS AND HEXAGONS

All intermediate sizes take next higher extra.
Base sizes 1½″ to 2¾″ inclusive.

Size	Extra per lb. Cents	Size	Extra per lb. Cents
¼″ and 9/32″	9.0	5/8″ to 31/32″ inclusive	1.5
5/16″ and 11/32″	7.5	1″ to 1 15/32″ inclusive	0.75
3/8″ to 15/32″ inclusive	4.5	1½″ to 2¾″ inclusive	Base
½″ to 19/32″ inclusive	3.0	2 15/16″ to 3″ inclusive	1.5

Special Extras for larger sizes, include Rough Turning, as follows:

3 1/16″ to 4″ inclusive	4.0	6⅛″ to 7″ inclusive	8.0
4⅛″ to 5″ inclusive	5.0	7⅛″ to 8″ inclusive	10.0
5⅛″ to 6″ inclusive	6.0	8⅛″ to 10″ inclusive	13.0

SQUARES AND FLATS

Width of Section, Inches	Thickness of Section—Inches; Extras Per 100 Pounds—Cents																					
	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	3	3 1/2	4	5	6	7	8	9	10
1/4	60	40	20	13	8																		
5/16	50	30	16	10																			
3/8	40	20	12																				
7/16	20	14	10	8	6	4	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1/2	14	10	8	6	4	3	2	1															
9/16	12	8	6	4	3	2	1																
5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1 1/8	16	12	8	6	4	3	2	1															
1 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1 3/8	14	10	8	6	4	3	2	1															
1 1/2	12	8	6	4	3	2	1																
1 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2 1/8	16	12	8	6	4	3	2	1															
2 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2 3/8	14	10	8	6	4	3	2	1															
2 1/2	12	8	6	4	3	2	1																
2 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3 1/8	16	12	8	6	4	3	2	1															
3 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3 3/8	14	10	8	6	4	3	2	1															
3 1/2	12	8	6	4	3	2	1																
3 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4 1/8	16	12	8	6	4	3	2	1															
4 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4 3/8	14	10	8	6	4	3	2	1															
4 1/2	12	8	6	4	3	2	1																
4 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5 1/8	16	12	8	6	4	3	2	1															
5 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5 3/8	14	10	8	6	4	3	2	1															
5 1/2	12	8	6	4	3	2	1																
5 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6 1/8	16	12	8	6	4	3	2	1															
6 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6 3/8	14	10	8	6	4	3	2	1															
6 1/2	12	8	6	4	3	2	1																
6 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7 1/8	16	12	8	6	4	3	2	1															
7 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7 3/8	14	10	8	6	4	3	2	1															
7 1/2	12	8	6	4	3	2	1																
7 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8 1/8	16	12	8	6	4	3	2	1															
8 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8 3/8	14	10	8	6	4	3	2	1															
8 1/2	12	8	6	4	3	2	1																
8 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9 1/8	16	12	8	6	4	3	2	1															
9 1/4	20	16	12	8	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9 3/8	14	10	8	6	4	3	2	1															
9 1/2	12	8	6	4	3	2	1																
9 5/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9 3/4	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9 7/8	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
10	10	6	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

EXTRAS IN CENTS PER POUND

Extras for Quantity on page 294.

Intermediate sizes take next higher extra.

EXTRAS FOR QUANTITY

ALLOY MACHINERY STEEL

(Cold Finished or Hot Rolled)

	Extra Per 100 lbs.
1000 lbs. and over of a size and grade	None
500 lbs. to 999 lbs. of a size and grade	$0.25
300 lbs. to 499 lbs. of a size and grade	.75
Under 300 lbs. of a size and grade	1.25

For orders totaling under 100 lbs. add $1.25 per 100 lbs. extra to prices shown for under 300 lbs. All grades of alloys in one finish may be combined to eliminate this extra.

TOOL STEEL

The following extras are applicable to individual items of a size of a grade ordered at one time for shipment at one time:

	Extra Per lb., Cents
1,000 lbs. of a size or over	Base
750 lbs.—999 lbs.	0.25
500 lbs.—749 lbs.	0.5
400 lbs.—499 lbs.	1.0
300 lbs.—399 lbs.	1.5
200 lbs.—299 lbs.	2.5
100 lbs.—199 lbs.	3.5
50 lbs.— 99 lbs.	4.5
25 lbs.— 49 lbs.	6.0
Under 25 lbs.	7.5

HIGH SPEED STEEL

These extras are applicable to individual items of a size of a grade ordered at one time for shipment at one time.

	Extra Per lb., Cents
1,000 lbs. of a size or over	Base
750—999 lbs.	0.5
500—749 lbs.	1.0
400—499 lbs.	2.0
300—399 lbs.	3.0
200—299 lbs.	5.0
100—199 lbs.	7.0
50— 99 lbs.	9.0
25— 49 lbs.	12.0
Under 25 lbs.	15.0

ANNEALING AND HEAT TREATING EXTRAS

	(Extra Per lb. in Cents) Annealing	Heat Treating
Alloy Machinery Steel	1.5	2.5
Tool Steel	1.5	..
High Speed Steel	2.0	..

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

WAREHOUSE QUANTITY EXTRAS AND DEDUCTIONS

HOT ROLLED FINISH

(Except Alloy Machinery Steels)

		Per 100 lbs.
40,000 lbs. and over	Deduct	$0.40
10,000 lbs. to 39,999	Deduct	.30
2,000 to 9,999 lbs.	Deduct	.20
500 to 1,999 lbs.		None
100 to 499 lbs.	Add	.50
Under 100 lbs.	Add	$1.00

HOT ROLLED STRIP (Hoops and Bands)
POTTS JJ SOFT STEEL BARS
BAR SIZE SHAPES
REFINED IRON BARS
THREDWEL SCREW STOCK
ELASTUF MEDIA Machinery Steel
SPRING STEEL
STRUCTURAL SHAPES
PLATES:
Sheared and Universal Mill
High Carbon .35/.45c
Diamond Pattern
HOT ROLLED STEEL SHEETS
(Blue Annealed)

} Apply on total order of all grades in this group

Hot Rolled ELASTUF PENN
WEARTUF Plates
ARMCO Ingot Iron Plates
ARMCO Hot Rolled Sheets
(Blue Annealed)

} Apply on total order of individual grades

COLD FINISHED STEEL

		Extra Per 100 lbs.
1000 lbs. and over of a size and grade		None
500 lbs. to 999 lbs. of a size and grade	Add	$0.25
300 lbs. to 499 lbs. of a size and grade	Add	1.00
Under 300 lbs. of a size and grade	Add	1.75
If total order for all sizes is under 100 lbs.	Add	3.00

CONCRETE REINFORCING BARS

		Extra Per 100 lbs.
30,000 lbs. and over* aggregate		None
10,000 lbs. to 29,999 lbs.* aggregate	Add	$0.15
2,000 lbs. to 9,999 lbs.* aggregate	Add	.25
Less than 2,000 lbs.* aggregate	Add	.50

*A total order for a specific identified project constitutes the aggregate quantity regardless of size, length or time of delivery.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

SAW CUTTING EXTRAS TOOL STEEL

Extras in Cents per Pound

Length of Cut or Multiple in Inches	Machine Cutting Dead Lengths: Rounds up to 2", incl. All Squares, Flats and Other Shapes	Machine Cutting Dead Lengths: Rounds Over 2"	Shearing or Breaking or Machine Cutting Multiples in Bar Lengths: Rounds up to 2", incl. All Squares, Flats and Other Shapes	Shearing or Breaking or Machine Cutting Multiples in Bar Lengths: Rounds Over 2"
1/4" to under 5/16"	46.0	46.0	....	....
5/16" " " 3/8"	43.0	43.0	....	....
3/8" " " 7/16"	40.0	40.0	....	....
7/16" " " 1/2"	37.0	37.0	....	....
1/2" " " 9/16"	34.0	34.0	....	....
9/16" " " 5/8"	31.0	31.0	....	....
5/8" " " 11/16"	28.0	28.0	....	....
11/16" " " 3/4"	26.0	26.0	....	....
3/4" " " 7/8"	24.0	24.0	....	....
7/8" " " 1"	20.0	20.0	....	....
1" " " 1 1/8"	18.0	18.0	....	....
1 1/8" " " 1 1/4"	16.0	16.0	....	....
1 1/4" " " 1 3/8"	14.0	14.0	....	....
1 3/8" " " 1 1/2"	13.0	13.0	....	....
1 1/2" " " 1 5/8"	12.0	12.0	....	....
1 5/8" " " 1 3/4"	11.0	11.0	....	....
1 3/4" " " 1 7/8"	10.0	10.0	....	....
1 7/8" " " 2"	9.5	9.5	....	....
2" " " 2 1/4"	9.0	9.0	....	....
2 1/4" " " 2 1/2"	8.0	8.0	....	....
2 1/2" " " 2 3/4"	7.0	7.0	....	....
2 3/4" " " 3"	6.5	6.5	....	....
3" " " 3 1/4"	6.0	6.0	....	....
3 1/4" " " 3 1/2"	5.5	5.5	....	....
3 1/2" " " 3 3/4"	5.0	5.0	....	....
3 3/4" " " 4"	4.5	4.5	....	....
4" " " 5"	4.0	4.0	....	....
5" " " 6"	3.5	3.5	....	....
6" " " 7"	3.5	3.5	1.0	1.0
7" " " 8"	3.0	3.0	1.0	1.0
8" " " 10"	2.5	2.5	1.0	1.0
10" " " 14"	2.0	2.0	1.0	1.0
14" " " 24"	2.0	1.5	1.5	1.0
24" " " 36"	2.0	1.0	2.0	1.0
36" " " 120"	2.5	1.0	2.5	1.0
120" and over	1.0	1.0	1.0	1.0

Minimum Charge 35¢ per section.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

SAW CUTTING EXTRAS HIGH SPEED STEEL

Extras in Cents per Pound

Length of Cut or Multiple in Inches	Machine Cutting Dead Lengths: Rounds up to 2″, incl. All Squares, Flats and Other Shapes	Machine Cutting Dead Lengths: Rounds Over 2″	Shearing or Breaking or Machine Cutting Multiples in Bar Lengths: Rounds up to 2″, incl. All Squares, Flats and Other Shapes	Shearing or Breaking or Machine Cutting Multiples in Bar Lengths: Rounds Over 2″
¼″ to under 5/16″	65.0	65.0	....	....
5/16″ " " 3/8″	60.0	60.0	....	....
3/8″ " " 7/16″	55.0	55.0	....	....
7/16″ " " ½″	50.0	50.0	....	....
½″ " " 9/16″	45.0	45.0	....	....
9/16″ " " ⅝″	40.0	40.0	....	....
⅝″ " " 11/16″	36.0	36.0	....	....
11/16″ " " ¾″	33.0	33.0	....	....
¾″ " " ⅞″	30.0	30.0	....	....
⅞″ " " 1″	26.0	26.0	....	....
1″ " " 1⅛″	23.0	23.0	....	....
1⅛″ " " 1¼″	20.0	20.0	....	....
1¼″ " " 1⅜″	18.0	18.0	....	....
1⅜″ " " 1½″	16.0	16.0	....	....
1½″ " " 1⅝″	15.0	15.0	....	....
1⅝″ " " 1¾″	14.0	14.0	....	....
1¾″ " " 1⅞″	13.0	13.0	....	....
1⅞″ " " 2″	12.0	12.0	....	....
2″ " " 2¼″	11.0	11.0	....	....
2¼″ " " 2½″	10.0	10.0	....	....
2½″ " " 2¾″	9.0	9.0	....	....
2¾″ " " 3″	8.0	8.0	....	....
3″ " " 3¼″	7.5	7.5	....	....
3¼″ " " 3½″	7.0	7.0	....	....
3½″ " " 3¾″	6.5	6.5	....	....
3¾″ " " 4″	6.0	6.0	....	....
4″ " " 5″	5.5	5.5	....	....
5″ " " 6″	5.0	5.0	....	....
6″ " " 7″	4.5	4.5	2.0	2.0
7″ " " 8″	4.0	3.5	2.0	2.0
8″ " " 10″	3.5	3.0	2.0	2.0
10″ " " 14″	3.0	2.5	2.0	2.0
14″ " " 24″	3.5	2.5	3.0	2.0
24″ " " 36″	4.0	2.0	4.0	2.0
36″ " " 108″	5.0	2.0	5.0	2.0
108″ and over	2.0	2.0	2.0	2.0

Minimum Charge 35¢ per section.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

SAW CUTTING EXTRAS ALLOY MACHINERY STEELS

Extra Per 100 Pounds
According to Length of Pieces Cut
Minimum Charge 35¢ per Section

ROUNDS

Size	Over 6′ 0″	Over 3′ 0″ to 6′ 0″	Over 2′ 0″ to 3′ 0″	Over 1′ 0″ to 2′ 0″	Over 6″ to 1′ 0″	Over 3″ to 6″
⅛″ to ⅜″ inc.	$1.10	$1.50	$2.50	$3.00	$5.30	$12.00
Over ⅜″ to ½″ inc.	.75	1.00	1.60	2.00	3.50	8.00

	Over 8′ 0″	Over 5′ 0″ to 8′ 0″	Over 3′ 0″ to 5′ 0″	Over 2′ 0″ to 3′ 0″	Over 1′ 0″ to 2′ 0″	Over 6″ to 1′ 0″	Over 3″ to 6″
Over ½″ to 1″ Inc.	$0.45	$0.65	$0.95	$1.35	$1.80	$3.25	$7.00

	Over 10′ 0″	Over 5′ 0″ to 10′ 0″	Over 3′ 0″ to 5′ 0″	Over 2′ 0″ to 3′ 0″	Over 1′ 0″ to 2′ 0″	Over 6″ to 1′ 0″	Over 3″ to 6″
Over 1″ to 2″ inc.	$0.40	$0.60	$0.90	$1.10	$1.40	$2.60	$5.50
Over 2″ to 4″ inc.	.35	.50	.80	.95	1.25	2.25	5.00
Over 4″ to 6½″ inc.	.30	.40	.65	.90	1.00	2.00	4.50
Over 6½″ to 7″ inc.	.25	.35	.50	.80	.90	1.80	4.00
Over 7″ to 8″ inc.	.20	.30	.45	.70	.80	1.50	3.50
Over 8″	.15	.25	.35	.60	.70	1.20	3.00

SQUARES AND HEXAGONS

	Over 6′ 0″	Over 4′ 0″ to 6′ 0″	Over 2′ 0″ to 4′ 0″	Over 1′ 0″ to 2′ 0″	Over 6″ to 1′ 0″	Over 3″ to 6″
⅛″ to ⅜″ inc.	$1.00	$1.50	$2.00	$3.25	$5.90	$11.50
Over ⅜″ to ½″ inc.	.80	1.20	1.80	2.25	4.25	9.00
Over ½″ to 1″ inc.	.50	.80	1.40	2.00	3.50	8.00

	Over 8′ 0″	Over 4′ 0″ to 8′ 0″	Over 2′ 0″ to 4′ 0″	Over 1′ 0″ to 2′ 0″	Over 6″ to 1′ 0″	Over 3″ to 6″
Over 1″ to 2″ inc.	$0.45	$0.75	$1.20	$1.60	$3.00	$6.50
Over 2″ to 3″ inc.	.40	.70	1.10	1.40	2.70	6.00
Over 3″ to 4″ inc.	.35	.60	.90	1.25	2.40	5.00
Over 4″ to 5″ inc.	.30	.40	.65	1.00	2.00	4.50

Lengths 3″ and under: Pages 300-302.

SAW CUTTING CHARGES FROM WAREHOUSE

FLATS - ANY LENGTH PER CUT CHARGE

For All Steels except Alloy Machinery, Tool and High Speed

	1/8" to 5/16"	1/4" to 5/16"	3/8" to 7/16"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 1/4"	1 1/2"	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"	3"	3 1/2"	4"	Minimum Charge
Up to 1" wide incl.	.03	.03	.04	.04	.05	.07	.08													.35
" " 1 1/4" " "	.03	.04	.05	.05	.07	.08	.08	.10	.12											
" " 1 1/2" " "	.03	.05	.07	.07	.07	.08	.10	.12	.12	.14										.40
" " 1 3/4" " "	.04	.07	.07	.07	.08	.10	.12	.14	.14	.18	.20									
" " 2" " "	.04	.07	.07	.08	.10	.12	.12	.14	.18	.18	.20	.24								.55
" " 2 1/4" " "	.05	.07	.08	.08	.12	.14	.14	.18	.18	.20	.24	.28	.30							
" " 2 1/2" " "	.05	.07	.08	.10	.12	.14	.18	.18	.20	.20	.28	.30	.32	.34						.85
" " 3" " "	.07	.08	.10	.10	.12	.14	.18	.20	.24	.28	.30	.32	.35	.42	.50	.55				1.00
" " 3 1/2" " "	.07	.08	.10	.12	.14	.18	.20	.24	.28	.32	.32	.35	.45	.50	.55	.55	.60			1.20
" " 4" " "	.10	.10	.12	.14	.18	.20	.24	.28	.30	.32	.35	.35	.45	.52	.60	.62	.70	.80		1.50
" " 4 1/2" " "	.12	.12	.14	.18	.20	.24	.28	.30	.32	.35	.45	.45	.60	.65	.70	.75	.80	.90	1.10	
" " 5" " "	.12	.12	.18	.18	.20	.28	.30	.32	.35	.35	.45	.45	.60	.68	.75	.80	.85	1.00	1.25	
" " 6" " "	.12	.14	.20	.20	.30	.30	.32	.35	.35	.45	.45	.60	.60	.72	.85	.90	1.00	1.20	1.40	
" " 7" " "	.13	.16	.22	.22	.32	.34	.36	.38	.40	.50	.50	.65	.65	.85	.95	1.02	1.10	1.35	1.55	1.75
" " 8" " "	.14	.18	.24	.24	.32	.34	.36	.38	.40	.50	.50	.65	.65	1.05	1.10	1.10	1.20	1.45	1.65	
" " 10" " "	.15	.22	.28	.28	.38	.40	.42	.44	.44	.54	.54	.70	.70	1.30	1.40	1.40	1.50	1.60	1.80	
" " 12" " "	.17	.26	.32	.32	.44	.48	.50	.50	.50	.60	.60	.75	.75	1.40	1.55	1.60	1.75	1.80	2.00	

Minimum Charge for Any Cutting 35c

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

SAW CUTTING CHARGES FROM WAREHOUSE

For all Steels Except Alloy Machinery, Tool, and High Speed

Minimum charge for any cutting, 35¢. The minimum charge applies on any length, even on multiple cutting, until the aggregate at the per cut price exceeds the minimum charge. Examples: 3/8" Rd., 12" and longer, 1 to 17 cuts, 35¢ total; 18 cuts or more, 2¢ per cut. 3/8" Rd., shorter than 12", first cut, 35¢, second to fourth cut, 20¢ each.

Lengths 12" and Longer—Or a Single Cut of any Length

(Same Size and Grade)

ROUNDS

Diameter	Minimum Charge	Per Cut
3/8" and under	$0.35	$0.02
7/16" to 11/16" incl	.35	.04
3/4" to 1" incl	.35	.07
1 1/16" to 1 1/4" incl	.35	.10
1 3/8" to 1 5/8" incl	.35	.12
1 3/4"	.42	.16
1 7/8"	.42	.16
2"	.42	.20
2 1/8"	.55	.20
2 1/4"	.55	.26
2 3/8"	.55	.26
2 1/2"	.55	.35
2 5/8"	.70	.35
2 3/4" to 3" incl	.70	.40
3 1/4"	.80	.40
3 1/2"	.80	.46
3 3/4"	.85	.46
4"	.85	.60
4 1/2"	1.00	.60
5"	1.10	.75
5 1/2"	1.30	1.00
6"	1.30	1.20
6 1/2"	1.45	1.20
7"	1.55	1.45
7 1/2"	1.65	1.60
8"	1.80	1.75
8 1/2"	1.95	1.90
9"	2.10	2.05
9 1/2"	2.30	2.25
10"	2.50	2.50

Round Cold Finished Bars in lengths 10′ to 12′, 16′, 20′, and 24′ considered standard, with no extra charge for furnishing to these lengths.

Intermediate sizes take price of next larger size.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

SAW CUTTING CHARGES FROM WAREHOUSE

For all Steels Except Alloy Machinery, Tool, and High Speed

Minimum charge for any cutting, 35¢. The minimum charge applies on any length, even on multiple cutting, until the aggregate at the per cut price exceeds the minimum charge. Examples: 3/8" Square and Hexagon, 12" and longer, 1 to 11 cuts, 35¢ total; 12 cuts or more, 3¢ per cut. 3/8" Square and Hexagon, shorter than 12", first cut, 35¢, second to fourth cut, 23¢ each.

Lengths 12" and Longer—Or a Single Cut of any Length

(Same Size and Grade)

SQUARES AND HEXAGONS

Diameter	Minimum Charge	Per Cut
3/8" and under	$0.35	$0.03
7/16" to 1/2" incl	.35	.04
9/16" to 11/16" incl	.35	.05
3/4" to 1" incl	.35	.08
1 1/16" to 1 1/8" incl	.35	.12
1 3/16" to 1 1/4" incl	.35	.15
1 3/8" to 1 1/2" incl	.35	.18
1 5/8" to 1 3/4" incl	.50	.20
1 7/8" to 2" incl	.50	.22
2 1/16" to 2 1/4" incl	.60	.30
2 5/16" to 2 1/2" incl	.80	.35
2 9/16" to 2 3/4" incl	.95	.40
2 13/16" to 3" incl	.95	.50
3 1/4"	1.10	.60
3 1/2"	1.10	.60
3 3/4"	1.20	.90
4"	1.25	1.00
4 1/2"	1.35	1.10
5"	1.50	1.25
5 1/2"	1.65	1.40
6"	1.90	1.65

Round Cold Finished Bars in lengths 10′ to 12′, 16′, 20′, and 24′ are considered standard, with no extra charge for furnishing to these lengths.

Intermediate sizes take price of next larger size.

SAW CUTTING CHARGES FROM WAREHOUSE

For All Steels except Alloy Machinery, Tool and High Speed

Minimum charge for any cutting, 35¢. The minimum charge applies on any length, even on multiple cutting, until the aggregate at the per cut price exceeds the minimum charge. Examples: 3/8" Square and Hexagon, 12" and longer, 1 to 11 cuts, 35¢ total; 12 cuts or more, 3¢ per cut. 3/8" Square and Hexagon, shorter than 12", first cut, 35¢, second to fourth cut, 23¢ each.

Lengths Shorter than 12"—Except for a Single Cut (See Page 300)

(Same Size and Grade)

Diameter	2 to 4 Cuts—Per Cut		5 to 24 Cuts—Per Cut		25 or More Cuts—Per Cut	
	Rounds	Sqs. & Hex.	Rounds	Sqs. & Hex.	Rounds	Sqs. & Hex.
3/8" and under	$0.20	$0.23	$0.12	$0.15	$0.02	$0.03
7/16" to 11/16" incl.	.21	.24	.13	.16	.04	.05
3/4" to 1" incl.	.23	.25	.15	.17	.06	.07
1 1/16" to 1 1/4" incl.	.25	.28	.17	.19	.08	.09
1 3/8" to 1 5/8" incl.	.26	.30	.19	.21	.09	.12
1 3/4"	.28	.31	.20	.24	.12	.13
1 7/8"	.29	.33	.21	.26	.14	.15
2"	.31	.34	.23	.27	.15	.16
2 1/8"	.33	.35	.24	.28	.16	.17
2 1/4"	.34	.36	.25	.29	.16	.17
2 3/8"	.38	.44	.27	.30	.17	.18
2 1/2"	.43	.50	.28	.31	.18	.20
2 5/8"	.45	.55	.29	.32	.19	.21
2 3/4"	.50	.60	.31	.33	.20	.22
3"	.50	.65	.32	.35	.21	.23
3 1/4"	.54	.70	.32	.36	.22	.24
3 1/2"	.58	.75	.33	.37	.23	.25
3 3/4"	.65	.90	.35	.39	.24	.28
4"	.75	1.00	.36	.40	.25	.30
4 1/2"	.80	1.10	.40	.45	.30	.33
5"	.95	1.25	.45	.50	.32	.35
5 1/2"	1.10	1.45	.55	.60	.40	.40
6"	1.20	1.60	.65	.70	.50	.45
6 1/2"	1.20	....	.90	....	.70	....
7"	1.45	....	1.10	....	.85	....
7 1/2"	1.60	....	1.20	....	.95	....
8"	1.75	....	1.30	....	1.05	....
8 1/2"	1.90	....	1.45	....	1.20	....
9"	2.05	....	1.65	....	1.35	....
9 1/2"	2.25	....	1.90	....	1.55	....
10"	2.45	....	2.20	....	1.75	....

Round Cold Finished Bars in lengths 10′ to 12′, 16′, 20′, and 24′ are considered standard, with no extra charge for furnishing to these lengths.

Intermediate sizes take price of next larger size.

Minimum Charge for Any Cutting, 35¢.

Philadelphia
REGent 7450
Park 5351

Baltimore
Vernon 8260

WAREHOUSE SHEARING EXTRAS

Cutting extras per 100 lbs., applicable to all materials ordered in other than stock lengths.

Charging Unit, 100 lbs.	5′ and Over	Under 5′ to 3′	Under 3′ to 2′	Under 2′ to 1′	Under 1′ to 6″
Structural Shapes.....	$0.00	$0.10	$0.25	$0.50	$1.55
†Angles under 3″ x ¼″.... †Channels under 3″..... †Tees under 3″..... Down to and incl. 1½	.25	.25	.50	.75	1.55
†Angles under 1½″..... †Channels under 1½″..... †Tees under 1½″.....	.50	.50	.75	1.00	1.55
†Round, Square and Hexagon Bars up to and including 2″..... †Flat Bars and Bands 6″ and Narrower, up to and including 1½″ thick....	.25	.30	.40	.50	1.55
†Round, Square and Hexagon Bars over 2″..... †Flat Bars over 1½″ thick.	Cold Sawed Only—see pages 299-302 incl. for Cutting Charges				
Concrete Reinforcing Bars	No Cutting Charges				On Applicat'n
Plates 3/16″ to 1″ inclusive, also 3/16″ Sheets and 3/16″ Bands wider than 6″....	.00	.10	.25	.50	1.55
Same as above, cut both ways.....	.25	.35	.50	.75	1.55
Plates over 1″ Thick, Torch cut to Regular or Special Shapes.....	On Application				
Diamond Pattern Floor Plates, cut one way.....	.25	.50	.50	.75	1.55
Diamond Pattern Floor Plates, cut both ways...	.50	.75	.75	1.00	1.55

SHEET SHEARING CHARGES

All Grades Except Stainless

Gage	Per 100 Lbs. Length Only: 5′ and Over	Under 5′ to 1′ 0″	Under 1′ to 6″	Width Only: 6″ and Over	Under 6″ to 3″	Under 3″ to 1″
No. 8 & No. 10	.25	.35	.45	.25	.35	.45
No. 12 & No. 14	.35	.45	.55	.35	.45	.50
No. 16 & No. 18	.45	.55	.65	.45	.55	.75
No. 20 & No. 22	.55	.65	.75	.55	.65	.90
No. 24 & No. 26	.65	.75	.85	.65	.75	1.00
No. 27 & No. 28	.75	.85	.95	.75	.85	1.20
No. 29 & No. 30	.85	.95	1.05	.85	.95	1.40

FOR SHEARING TO WIDTH AND LENGTH—ADD BOTH CHARGES LESS .15 CWT.

Base price applicable to the material before shearing to be used. *For example:* No. 10 Ga. 24″ Wide cut into strips 8″ Wide takes the base price for Hot Rolled Sheets.

NOTE: Standard Variations, page 304.

BASIS FOR WEIGHT CHARGED FOR CUT MATERIAL

NET WEIGHT, after cutting:

Bars, Bar Size Angles, Structurals, Plates, 3/16″ Sheets and Bands over 6″ wide. Diamond Pattern Plates ⅛″ and heavier. Sketch Plates at the weight of the rectangle required.

GROSS WEIGHT, before cutting:

Bands, Hoops, Bar-Size Channels and Tees, Sheets lighter than 3/16″, Half Rounds, Ovals and Half Ovals, and Diamondette Pattern Sheets ⅛″ and lighter.

Structural Shapes, Reinforcing Bars, are charged on book weight, all other items on scale weight.

On items charged at Gross Weight we will when requested send scrap resulting from cutting, otherwise we will allow for scrap value. There is, however, no allowance for galvanized sheet scrap.

†Minimum Cutting Charge, 25 cents lump sum.

For allowable variations in Shearing, see page 304.
Cutting Extras on Cold Finished Steel, pages 299-302 incl.
Cutting Extras on Tool and Alloy Steels, pages 296-298.

STANDARD VARIATIONS IN SHEARING

MATERIAL SHEARED FROM WAREHOUSE STOCK

The shearing variation listed below governs shearing on commodities as specified for shipments from warehouse stock. All orders we accept are subject to these variations in shearing unless otherwise specified.*

Bars and Bar Shapes	Over	Under
Rounds and Squares up to 2"	1/4"	1/4"
Flats, 1/4" to 5/8" thick	1/8"	1/8"
Flats, over 5/8" thick	1/4"	1/4"
Shapes, up to but not including 3"	1/8"	1/8"
	Over	**Under**
Beams, Channels and Tees, 6" and under	1/4"	1/4"
Beams, Channels and Tees, over 6"	3/8"	3/8"
Angles, 3" and larger	1/8"	1/8"
Plates (Except Sketches)	**Over**	**Under**
U. M. Plates, 5/8" and under, 24" wide and under	1/4"	1/4"
U. M. Plates, over 5/8", 24" wide and under	1/4"	1/4"
Plates, 5/8" and under, 36" wide and under	1/4"	1/4"
Plates, 5/8" and under, over 36" wide	1/4"	1/4"
Plates, over 5/8" up to 11 ft. 5 inches on cut edge	5/16"	5/16"
Plates, all thicknesses where cutting edge is longer than 11 feet 5 inches	5/16"	5/16"
Sheets—Rectangular	**Over**	**Under**
Sheets, No. 8 and 10 Gauge	3/16"	3/16"
Sheets, No. 12 to 18 Gauge	1/8"	1/8"
Sheets, No. 20 to 30 Gauge	1/16"	1/16"
Strip Steel	**Over**	**Under**
.187" and over	1/8"	1/8"
.125" to .156", incl.	1/32"	1/32"
.018" to .120", incl.	1/64"	1/64"

*Prices for shearing to closer tolerances quoted upon application.

MATERIAL ORDERED IN STOCK SIZES

All orders covering material in stock lengths, where no warehouse shearing is required, are subject to mill length variation, as follows:

Shapes to Specified Lengths	Over	Under
Rounds and Squares up to 2"	1/4"	1/4"
Rounds and Squares 2" to 3", incl.	3/8"	3/8"
Rounds and Squares 3" to 4 1/2" (incl.), up to and including 20 ft. long	3/4"	3/4"
Rounds and Squares over 3" to 4 1/4" (incl.), over 20 ft. long	3/4"	1 "
Rounds over 4 1/4" to 7 1/4" (incl.), up to and including 20 feet long	3/4"	3/4"
Rounds over 4 1/4" to 7 1/4" (incl.), over 20 feet long	3/4"	1 1/4"
Flats, 1" to 3" wide (incl.)	1/4"	1/4"
Flats over 3" to 6", up to and including 20 feet long	3/8"	3/4"
Flats over 3" to 6" wide, over 20 feet long	5/8"	1 1/4"
Shapes up to but not including 3"	1/4"	1/4"
Structural	**Over**	**Under**
Beams and Channels	3/8"	3/8"
Angles—Zee and other shapes	3/4"	0 "
Universal Plates, length	3/4"	0 "
Sheared Plates, length, width	1/4"	1/4"

MEMORANDUM

MEMORANDUM

MEMORANDUM

MEMORANDUM

MEMORANDUM

MEMORANDUM

MEMORANDUM

MEMORANDUM

WIRE-O BINDING
PATENTS PENDING

FRANKLIN PRINTING CO.
PHILADELPHIA

PRICE SHEET

HORACE T. POTTS CO.

East Erie Ave. and D St.
Philadelphia, Pa.

504 St. Paul St.
Baltimore, Md.

REVISED TO JULY 30, 1938

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

TELEPHONE SERVICE

PHILADELPHIA	BALTIMORE
BELL: REGENT 7450	VERNON 8260
KEYSTONE: PARK 5351	EMERGENCY CALLS
EMERGENCY CALLS	TUXEDO 2353
REGENT 7457	LIBERTY 3347

Wm. C. Spencer
C. Lincoln Rutter
A. W. Ainsworth

T. I. Potts
C. R. Spencer

Tool Steels
Alloy Steels
Stainless Steels
Heat Resisting Steels

Welding Rods
Expanded Metals
and Flat Mesh

J. Theo. Fritz
J. Melvin Lane
Miss I. Gallion

ELASTUF

Alloy and Carbon Machinery Steels

BASE PRICES (With Quantity Extras Included)		Page References: Plus Extras	Page
ELASTUF PENN			
Cold Finished			
Under 100 lbs. aggregate....	$7.80	Size Cutting	35 300–302
Under 300 lbs. of a size.....	6 55		
300 to 499 lbs. of a size.....	5.80		
500 to 999 lbs. of a size.....	5.05		
1000 lbs and over of a size....	4.80		

ELASTUF MEDIA
Precision Finish

	Under 100 Lbs. Aggregate	Under 300 Lbs.	300 Lbs. to 499 Lbs.	500 Lbs. to 999 Lbs.	1000 Lbs. and Over	Page References: Plus Extras	Page
3/8" dia.....	$9.30	$8.05	$7.30	$6.55	$6.30	Size Cutting	33 300–302
7/16" to 9/16" inc..	9.05	7.80	7.05	6.30	6.05		
5/8" to 1 1/8" inc..	8.80	7.55	6.80	6.05	5 80		
1 3/16" to 1 1/2" inc..	8.65	7.40	6.65	5.90	5.65		
1 9/16" to 1 7/8" inc..	8.35	7.10	6.35	5.60	5.35		
1 15/16" to 2 7/8" inc..	8.20	6.95	6.20	5.45	5.20		
2 15/16" to 6" inc....	7.85	6.60	5.85	5.10	4.85		

The above items are sold on Pittsburgh basis with LCL rate Pittsburgh to destination to be added and with Philadelphia (or other shipping point) to destination LCL rate allowed.

Bal.

PRICE SHEET—HORACE T. POTTS CO.

ELASTUF

Alloy and Carbon Machinery Steels

BASE PRICES (With Quantity Extras Included)	Price Per 100 lbs.	Page Reference Our Steel Hand Book 21st Edition: Plus Extras	Page
ELASTUF TYPE A			
Chrome Vanadium—Hot Rolled			
Under 300 lbs. of a size.....	$9.75	Size Cutting	140–142 298
300 to 499 lbs. of a size.....	9.25		
500 to 999 lbs. of a size.....	8.75		
1000 lbs. and over of a size...	8.50		
When Heat-Treated add to above prices.....	2.50		
ELASTUF CHRO-MOLY			
Chrome Molybdenum—Hot Rolled			
Under 300 lbs. of a size.....	$6 85	Size Cutting	137 298
300 to 499 lbs. of a size.....	6.35		
500 to 999 lbs. of a size.....	5.85		
1000 lbs. and over of a size..	5.60		
When Heat-Treated add to above prices.....	2.50		
ELASTUF SAE 3140			
Chrome Nickel—Hot Rolled			
Under 300 lbs. of a size.....	$7.10	Size Cutting	133–135 298
300 to 499 lbs. of a size.....	6.60		
500 to 999 lbs. of a size.....	6.10		
1000 lbs. and over of a size..	5.85		
When Heat-Treated add to above prices.....	2.50		
ELASTUF SAE 2335			
3½% Nickel—Hot Rolled			
Under 300 lbs. of a size.....	$8.50	Size Cutting	131 298
300 to 499 lbs. of a size.....	8.00		
500 to 999 lbs. of a size.....	7.50		
1000 lbs. and over of a size...	7.25		

For orders totaling under 100 lbs. add $1.25 per 100 lbs. extra to prices shown for under 300 lbs. All grades of hot rolled alloys may be combined to eliminate this extra.

The above grades are sold on Bethlehem basis with LCL rate Bethlehem to destination to be added, and with Philadelphia (or other shipping point) to destination LCL rate allowed.

ELASTUF PENN			
Machinery Steel—Hot Rolled			
under 100 lbs. of an order	$5.90	Size Cutting	128–129 299–302
100 to 399 lbs. of an order.	5.15		
400 to 1999 lbs. of an order.	4.65		
2000 to 9999 lbs. of an order	4.45		
10000 to 39999 lbs. of an order	4.35		
40000 lbs. and over of an order	4.25		
ELASTUF MEDIA			
Machinery Steel—Hot Rolled			
Under 100 lbs. of an order.	$5.00	Size Cutting	124 299-302
100 to 399 lbs. of an order..	4.25		
400 to 1999 lbs. of an order.	3.75		
2000 to 9999 lbs. of an order	3.55		
10000 to 39999 lbs. of an order	3.45		
40000 lbs. and over of an order	3.35		

*These items are FOB Philadelphia.

STAINLESS AND HEAT RESISTING STEELS

ALL FORMS AND ALL ANALYSES

(Prices on application)

SHEETS STRIP PLATES
SHAPES BARS FORGINGS
SEAMLESS PIPE AND TUBING
WELDED PIPE AND TUBING
PIPE FITTINGS CASTINGS
WIRE WELDING WIRE BOLTS
NUTS WASHERS NAILS
SCREWS, ETC.

CARPENTER TOOL STEELS

	Base Prices Per Lb.
GOLD STAR High Speed Steel	$1.10
SUPER STAR-ZENITH High Speed Steel	.77
STAR-ZENITH High Speed Steel	.67
STAR-MAX High Speed Steel	.54
D. Y. O. Tool Steel	.56
K-W Tool Steel	.48
HAMPDEN Tool Steel	.43
No. 610 Air Hardening Tool Steel	.43

Above steels take High Speed Steel classification of extras for size, quantity and all other extras.

TITAN Tool Steel	.10½
COMET Tool Steel	.14
EXTRA Tool Steel	.18
SPECIAL Tool Steel	.22
STENTOR Tool Steel	.24
EXCELLO Tool Steel	.27
SOLAR Tool Steel	.14
R. D. S. Tool Steel	.19

Above steels take Tool Steel classification of extras for size, quantity and all other extras.

TROJAN TOOL STEEL

	Base Prices Per Lb.
TROJAN No. 8 Not Annealed Octs. ¼" to 1½" incl. Hexs. ⅞" to 1¼" incl.	$ .05½
TROJAN No. 8 Not Annealed Other size Octs. and Hexs. and all Rds. Sqs. and Flats	.06¾
TROJAN No. 9½ Annealed	.06¾

Above steels take Tool Steel Classification of extras for size, quantity and all other extras

FORGINGS IN ALL STEELS

Send us your inquiries for forgings of all types